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ABSTRACT

A study was conducted to determine how 11,400 minutes were spent by 186 students in 10 classes in three secondary vocational education program areas (agricultural education, marketing and distributive education, and trade and industrial education) in seven high schools and area vocational schools in four states. The study attempted to find out how much time was spent on task and content as compared with time spent on noncontent and off task time such as breaks and doing nothing. Teachers' time also was recorded by two observers during 99 class periods over two weeks. Some of the findings include: (1) about 56 percent of the class time was spent on content by the students, although teachers allotted about 67 percent of time for content; (2) the proportions of time usage varied greatly among the individual classes as did the amount of time students were absent or late; (3) the amount of time on task spent by students varied widely--more among students in different classes than among students in the same class; (4) students spent the greatest time on task in long classes (146-176 minutes) with fewer students; (5) trade and industrial classes and agricultural classes had greater time on task than the marketing and distributive education classes; and (6) on the average, teachers spent 29 percent of their time providing one-to-one instruction. The study concluded that no typical class represented all vocational education classes. However, baseline data were provided that can be used for further research into how time on task affects student learning in vocational classes. (KC)

TIME ON TASK IN SELECTED VOCATIONAL EDUCATION CLASSES

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FOREWORD

Time on task is considered to be one of the most critical factors in school learning. Research in academic subjects is providing educators with a better understanding of ways to maximize student opportunities to learn. Prior to this study, there has been little studied about time on task in vocational education classes. The results of this study are intended to fill that void by providing a data base on the proportions of time spent by students and teachers on and off relevant tasks in their vocational education classes.

Researchers and teacher educators are intended to be the audience of this report. The purpose of this report is to present a picture, both graphically and verbally, of how 11,400 minutes were spent in ten vocational classes by 186 students and their teachers. The ten classes represented three program areas--agricultural education, marketing and distributive education, and trade and industrial education. Two project staff members spent two weeks in each class observing and recording the students' and teachers' activities each minute with observation instruments designed for the study.

Many people have spent a great deal of their time and energy on this study. While the teachers and other school personnel who participated in this study must remain anonymous, we sincerely thank them for allowing the observers the freedom to collect the data as was necessary. Special appreciation is extended to Dr. David Helm, Research for Better Schools; Dr. David Pucel, Minnesota State University; and Dr. Stanley Chow, Far West Laboratory for Educational Research and Development, for their thoughtful review of this report.

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Robert E. Taylor
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EXECUTIVE SUMMARY

Introduction

Time on task is one of the most critical factors that affects the amount students learn and achieve in school. Numerous studies show that the period of time students are actively engaged in a learning activity (time on task) relates positively to their academic achievement. As a consequence of the findings from studies conducted primarily in elementary classes, the National Commission on Excellence in Education (National Assessment of Educational Progress 1982) has identified time spent on subjects as one of the three variables most crucial to improving the quality of education.

Although the time on task research is changing educators' perspectives about classroom management, there has been very little such research conducted in secondary vocational education classes. The results of the research indicate that students in academic classes learn more when the time for learning and student involvement are increased, and when students have a high rate of success with learning activities. The results also show that students in academic classes make the greatest gains in achievement when their teachers spend most of the time lecturing, demonstrating, and leading discussions. The strategies for more effective teaching implied by these outcomes have not been tested in vocational education classes, nor are there baseline data on how time is spent in vocational education classes.

Objectives

The objectives, therefore, of this exploratory study were--

- to adopt/develop appropriate research/evaluation procedures for determining the proportion of time spent upon selected content areas in secondary vocational education programs, and
- to determine the proportion of time spent upon selected content areas in three secondary vocational education program areas.

Methodology

Ten secondary vocational education classes in three program areas (agricultural education, marketing and distributive education, trade and industrial education) were purposively selected for participation. The ten classes were located in seven

comprehensive high schools and area vocational schools at four types of sites (rural, suburban, urban, inner city) in four states. The activities of 186 students and ten teachers were observed and recorded, minute-by-minute for ten entire class periods during two consecutive weeks in the spring of 1982. The classes ranged from 46 to 176 minutes in length and had from seven to twenty-six students enrolled.

The observations were recorded on two types of keypunch-ready observation guides (individual students, entire class, and teacher) designed to show the amount of time students spent on task upon content (basic skills, technical skills, employability skills) and as compared with time spent on noncontent (set up, clean up, related activities) and off task time spent on breaks, socializing, and doing nothing. The teachers' time was recorded either as content areas or as other managerial, noncontent areas.

Over 11,400 minutes were observed during 99 class periods in the ten classes, with a total 22,800 minutes recorded since there were two observers using different observation guides in each class. The proportions of time spent on and off tasks were calculated by dividing the number of minutes spent on the activity by the total number of student minutes present in the class. Comparisons were calculated with t-tests and F-tests, and the Student-Newman-Keuls procedure was used to discern homogeneous subsets.

Findings

The findings of the study indicated the following:

- The average proportions of time spent by the students in the ten classes observed for ten class periods were:

Basic skills	= 6.74%	
Technical skills (practice and lecture)	= 41.17%	55.9% On task/content
Employability skills	= 7.99%	
Set up/clean up	= 7.18%	
Related/on task	= 6.07%	13.25% On task/noncontent
Off task (socializing, nothing)	= 25.27%	30.94% Off task
Break	= 5.67%	

- The proportions of time usage varied greatly among the individual classes, as did the amount of time students were absent or late. There was an average 20 percent absence/late rate during the first week observed compared with 17 percent during the second week.

- The proportion of time spent on task by the thirty students observed individually (three observed in each class by the second observer) ranged between 35 and 88 percent. There was a wider range of time on task/content among students in different classes than among students in the same class. Their absence ranged from 0.0 to 33.4 percent.

- There were no significant differences ($p < 0.05$) among the means of the three students observed individually and their class means for the proportion of time on task and off task. There were signficant differences ($p < 0.01$) for absence, however, with the individual students' absences less than the average of their classes.

- On the average, teachers allocated 67 percent of the class-time for time on content (basic skills, technical skills, employability skills) and spent the remaining 33 percent of the time on noncontent activities which included managerial activities such as roll taking.

  On the average, teachers spent over a fourth of their time (29 percent) providing one-to-one instruction. Additional pedagogical methods/activities included the following:

work at desk	11.8%
observe students at work	8.8%
give directions, instructions	8.8%
lecture	8.3%
talk to observer	3.7%
out of classroom	3.2%
talk to staff/nonclass students	2.8%
lead discussions	2.6%
make assignments	2.1%
demonstrate	1.7%
use audiovisuals	1.7%
lead questions/answers	1.7%

- There were significant differences ($p < .00$) for the proportions of time on task among short (46 to 56 minutes), medium (111-126 minutes), and long (146-176 minutes) classes. The greatest difference was between short and long classes, with long classes having a significantly higher proportion of time on task.

- There were significant differences ($p < 0.01$) for time on task among the three program areas (AG, MDE, T & I) represented in the study. MDE classes had the lowest, while T & I and AG classes had the highest proportions of time on task.

- There were significant differences ($p < 0.05$) for time on set up/clean up and technical skills between the three machine shops, while there were no significant differences for absence, time on basic skills, or time on emloyability skills.

- A significant difference ($p < 0.05$) was found for time on task between classes that had a substitute teacher and those that had the regular teacher. There was a higher proportion of time spent on task when the regular teacher was present, although the substitutes appeared to be task oriented and conscientious.

- Medium classes (15-17 students) had a significantly higher proportion ($p < 0.01$) of time on task (74 percent) than large classes (24-26 students; 59 percent). Incidentally, the small class (7 students), which was not included in the calculations, had the highest mean of 86 percent time on task.

- There were no significant differences ($p < 0.05$) among the days of the week for time on task when the averages of all classes were considered. The patterns of time on task varied considerably, however, among the ten classes individually.

- There was a significantly higher proportion of time ($p < 0.05$) spent on technical skills during the first week observed compared to the second week, while there was no significant difference for basic skills, employability skills, set up/clean up, and absence.

- There was no significant difference ($p < 0.05$) in the proportions of time spent upon basic skills, technical skills, employability skills, set up/clean up, and absence when every third or every fifth minute of observed activity was calculated rather than every minute.

Implications

The average proportions of time on task found in this study were very similar to the proportions found in other studies conducted in academic subject classes. Wide variations of time on task were found among the ten classes in the study, especially on

content. Such differences indicate that numerous factors contribute to time usage in secondary vocational education classes.

The students' time on content (55.9 percent) appeared to be consistently less than the amount allocated by the teachers (67 percent). This divergence would indicate that, as in academic classes, the students did not take full advantage of their opportunities to learn or practice skills. It can be inferred that teachers had a great deal of control over the time spent on content. The regular teachers induced their students to spend more time on task than did the substitute teachers.

Additional factors that contributed to time on task also cannot be overlooked. Longer classes and classes with fewer students had the highest proportions of time on task. The classes with more opportunities for hands-on activities--the T & I and AG classes in this study--had more time on task than the lecture-oriented MDE classes. The latter findings point to another inference that can only be made cautiously at this time, namely, that classes at area vocational schools provide more opportunity for time on task than do those in comprehensive high schools.

The most valuable contribution of the study, however, was to provide a data base of how time was spent by students and teachers in a variety of secondary vocational education classes over a period of time. The results show that the classes were indeed diverse, even when classes of similar content (e.g., machine shop) were compared. There was no "typical" class that could be truly representative of all vocational education classes, even within the same program area.

Recommended Research

Since there was no attempt made to relate specified outcomes (e.g., attainment of competencies) to time spent on task, it is strongly recommended that further studies investigate this relationship for vocational education classes. Equally important, further research is needed to examine the effects of teachers' managerial activities and instructional methods upon students' time on relevant tasks in secondary vocational education classes.

CHAPTER ONE

INTRODUCTION AND FRAMEWORK

Time on task is one of the most critical variables that affects the amount students learn and achieve in school. The time during which a student is actively engaged in a learning activity is called "time on task" (Bloom 1974). Numerous studies have indicated that the amount of time students are engaged in learning relates positively to their academic achievement (Bloom 1974, Fisher, et al. 1978, Stallings and Kaskowitz 1974). Consequently, the National Commission on Excellence in Education (National Assessment of Educational Progress 1982) has identified time spent on a subject, along with curriculum content and expectations held for students and teachers, as the three variables most crucial to improving the quality of education.

While the results of the time on task studies are changing educators' thinking about classroom management, there has been very little time on task research conducted in vocational education classes. The majority of the studies of time on task have been conducted with elementary students learning basic skills. The studies conducted with secondary students have also emphasized academic subjects, with sparse attention to vocational education. Currently the time on task research shows that student learning increases when time for learning is increased, time for student involvement is increased, and learning activities are planned to provide students a high rate of success. The research findings also show that students in academic classes make the greatest gains when teachers spend most of the time lecturing, demonstrating and leading discussions. The implications of these findings have not been tested in vocational education classes, nor are there baseline data on how time is actually spent in vocational education classes.

The purposes of this exploratory study, therefore, are to provide educators with methodology for determining how time is spent in vocational education classes and information about how time was actually spent in selected classes. In order to increase the effectiveness of vocational education, it is necessary to understand how students and teachers spend time in the classrooms, shops, and laboratories. These data will provide a foundation essential for further studies that correlate instructional strategies with student time on task and achievement of desired outcomes with student time on task. Furthermore, these data will be useful for formulating evaluative criteria to assess the effectiveness of vocational education programs.

Objectives

The two objectives of this study were--

- to adapt/develop appropriate research/evaluation procedures for determining the proportion of time spent upon selected content areas in secondary vocational education programs; and

- to determine the proportion of time spent upon selected content areas in three vocational education program areas.

Questions

To support the first objective in this study, the following questions were asked:

1. What are the differences among the days of the week in the proportion of time students spend on task?

2. What is the difference between the first and the second week of observation in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

3. If every 3rd or 5th minute had been recorded instead of every minute, what would be the difference in the proportion of time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

To accomplish the second objective in this study about time usage in vocational education classes, the following questions were asked:

1. What are the proportions of time spent by all students in the classes on task (content and non-content), off task, and on absence?

2. What are the proportions of time spent by the three selected students in each class on task (content and noncontent), off task, and on absence?

3. What is the difference between the mean of the three students in each class and the mean of all the students in the class in the proportion of time on task (content and noncontent), off task, and on absence?

4. What are the proportions of time spent by the teachers of the classes on content and on noncontent?

5. What are the proportions of time spent by teachers on various instructional methods and other activities?

6. What are the differences among short, medium, and long classes in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

7. What are the differences among the program areas (agricultural education, marketing and distributive education, trade and industrial education) in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

8. What are the differences among the three machine shops in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

9. What are the differences between classes taught by substitute teachers and those taught by the regular teacher in time on task?

10. What are the differences between classes with fewer or more students in the proportion of time on task?

Definitions

Overview

Many terms have been used in studies about time and education. Unfortunately, there is no common glossary that cuts across all the studies reviewed. The terms used in this study are defined in this section and related to other terms used in the literature.

Observation guide is the instrument used to record, every minute, the activities of teachers and students in vocational education classes. Two observation guides were used in this study. The first, called the class observation guide, was used to record the activities of all the students and the teacher. The second, called the student observation guide, was used to record the activities of three specified students. (Both guides are included in Appendix A.)

Time

Total class time is the largest unit of time considered in the study. Total class time is the precise amount of time, in minutes, that is officially scheduled for a particular vocational education class. The classes in this study ranged from 46 minutes to 176 minutes in length.

Allocated time is the amount of time, in minutes, provided by the teacher for curricular content activities during class time. Allocated time is the upper limit of time available for the specific content-related activities. It does not take into account the time individual students actually spend on the content-related activities. It is, therefore, a rather crude estimate of student involvement (Borg 1980).

Time on task is the amount of time, in minutes, students are attending to teacher-assigned activities that are both curricular content (time on task/content) and also noncurricular content (time on task/noncontent). Time on task/content is the amount of time, in minutes, students are engaged in curricular contents. Curricular contents include basic skills with technical skills; basic skills alone; technical skills, both theory and practice; knowledge of the world of work; job seeking, maintaining and advancing skills; and work attitudes and values. Time on task/noncontent includes setting up, cleaning up, listening to announcements, and selected youth organization activities.

Curricular Contents

Technical skills are thought of as the hands-on performance (practice), or the learning about (lecture) those work tasks of varying levels of skill that require proficiency, ability, or dexterity for complex, or highly complex cognitive understandings. Examples of technical skills are knowledge of occupation-related procedures and use of tools, equipment, and facilities.

Basic skills are also considered to be a curricular content area. They may be defined as the use of reading, mathematics, and both oral and written communications skills by students in vocational education classes (adapted from Weber et al. 1982). Examples of basic skills are calculating, writing, speaking, and reading in conjunction with technical skills.

Employability skills include the three curricular-content areas of "work attitudes or values", "job-seeking, maintaining, and advancing skills", and "knowledge of the world of work." These three areas were ultimately combined for analysis in this study because a relatively small proportion of time was spent upon each in the classes observed. The first of these three areas--work values or attitudes--is considered to be the teacher's or student's expression and reflection of those qualities

deemed worthy in the performance of vocational education class activities related to the performance of jobs. Examples are getting to class or work on time and doing one's work well. The second one--job-seeking, maintaining, and advancing skills--may be provided by the performance of those vocational education class activities concerned with locating and obtaining job placement both on an initial and an advanced basis. Examples of these skills include developing a resume and learning about interpersonal skills that are necessary for success on the job. The third area--knowledge of the world of work--is provided by vocational education class activities that contribute to one's understanding of how jobs are structured and how one prepares to engage in work. Examples of knowledge of the world of work activities are discussions about job opportunities, wage structures, job opportunities, and the social or personal implications of chosen jobs.

Assumptions

Three major assumptions were made in conducting this study. First, it was assumed that time on task is a critical variable for achievement in school learning. This assumption was based on evidence from a substantial body of research that has been conducted in elementary and secondary academic classes during the previous two decades. Second, it was assumed that important differences exist between elementary academic education and secondary vocational education that could have implications for instruction that maximizes time on task in vocational education classes. These differences can be studied best through direct observation in vocational education classes with instruments designed specifically for the varied activities in shop and laboratory classes. Third, it was assumed that while no consensus exists about the outcomes or goals of secondary vocational education, there are curricular-content areas that most educators would agree should be addressed in all programs.

Based upon these assumptions, a thorough review was conducted of previous studies and theoretical models about time as a variable of learning and achievement. The following brief review of the literature provides a foundation for this study. In addition, Appendix D contains abstracts of over fifty related studies useful for further study in this field.

First Assumption

Time on task is positively correlated with learning and achievement. Various measures of time have been studied as variables of school learning for almost a century. Educators have studied the length of the school day, the length of individual classes, the amount of time allocated for academic content, and the amount of time students are engaged with

academic content. Additional researchers have cross analyzed the results of the original studies to ascertain which time variables have the most predictability for increasing the effectiveness of schooling. The effects of the time spent in diverse types of classes with many different outcome goals are still to be determined. But one conclusion consistent among all the findings is that the time spent in school with relevant academic content is positively correlated with increased student learning and achievement. The particular unit of time, however, has been studied with varying findings related to achievement. Analysis of the research to date (Frederick and Walberg 1980) indicates the following:

- There is a modest but persistent correlation between the number of years of schooling and achievement. Correlations range between .26 and .71, although they are sizably lower when social class is controlled.

- There are inconsistent findings relating the number of days of instruction to achievement. While in half the studies there is no relationship, in the other half the correlations between days of instruction and achievement range from .32 to .69.

- There is a persistent correlation (.13 to .59) between the hours spent on content and achievement. When the relationships are analyzed by the amount of variation explained, the proportion ranged from 3 to 22 percent after other variables are entered in the equations.

Most recent time-related studies had their origins during the 1960s and 1970s in the process-product studies. These showed that classroom processes result in educational products such as student achievement. Numerous studies were conducted in various stages to discern which classroom practices lead to student achievement. Initially, the studies focused upon basic skills in elementary schools and have since evolved to include a variety of academic subjects in secondary schools. Very few of the studies addressed time on task in secondary vocational education classes.

Most of the time-related studies trace their theories about time to Carroll's (1963) model of school learning. The fundamental tenets in his model are that time is a critical variable in individual student learning and that students differ in the amount of time they need to learn a given unit to some set criterion. Carroll's model includes the five factors of aptitude,

ability perseverance, opportunity to learn, and quality of instruction reduced to the formula:

Degree of learning = f (time actually spent)

Carroll distinguished between elapsed time and the time the learner is actually spending on the act of learning as the time during which the learner is paying attention and trying to learn (1963).

Bloom's (1974) model of school learning was built upon Carroll's ideas. Bloom called the amount of time when the learner is actively engaged in learning the "time on task" (p. 682). In his comprehensive review of differences in learning under different classroom conditions in different nations, states, and communities, Bloom found that "while there can be no simple explanation for all of these differences, it seems to some of us that the percent of time the student spends on task in the classroom may be a powerful variable underlying most of these differences" (p. 684). Bloom commented that "thorough understanding of time and its use in school learning may help us turn this great potential increasingly toward the improvement of the schools and the improvement of the human condition" (p. 686).

Wiley and Harnischfeger (1974) formulated a model that was based in part upon Wiley's analysis of the controversial Coleman report, Equality of Educational Opportunity (1966). Wiley's analysis of the relationship between attendance and achievement in that study indicated that the quantity of schooling is a powerful variable in determining achievement. Borg (1980) demonstrated that increased time in school increases achievement by correlating time--as defined by the product of average daily attendance, number of hours per school day, and number of days per school year--with standardized achievement subset scores. In the Wiley-Harnischfeger model, as in Carroll's model, achievement is determined by two variables: the total time a student needs to learn a task and the total time the student actually spends on the task. The influence of all other variables, such as the curriculum, the student and teacher characteristics, and the quality of the instruction, is mediated by these two time variables.

The three models of time and learning developed by Carroll, Bloom, and Wiley-Harnischfeger provided the theoretical foundation for several empirical, observation-based studies. These models of time were the basis of the concept of academic learning time which has been a major contribution of the Beginning Teacher Evaluation Study or BTES (Fisher et al 1978). The BTES findings on allocated and engaged time that substantially agree with earlier research are derived from a stronger and more sophisticated data base (Borg 1980). Through direct observation, BTES researchers (Fisher et al 1978) collected substantial longitudinal

data about students' engagement or nonengagement with instructional tasks in elementary classes. Findings from the multiple linear regression analysis of the relationships between academic learning time and student achievement indicated that the proportion of allocated time that students are engaged in learning tasks was found to be positively correlated with achievement. In classes with the highest engagement rates, the teachers had allocated more time for the academic activities. Teachers allocated approximately 55 percent of the class time for academic activities, with another 25 percent devoted to subjects such as music, art, and physical education. The remaining 20 percent of the time was spent in noninstructional activities and transitions.

On the average, the second and fifth grade students in the BTES were engaged about 73 percent of the allocated time in math and reading. On the average, the students were engaged in academic activities about 1 hour 45 minutes or 40 percent of the in-class time. There was considerable variation among students, however, with some students engaged about 30 minutes more and others engaged about 30 minutes less than the average engagement rate (Rosenshine 1981).

Another series of studies, conducted by Stallings and her associates through the 1970s and 1980s (Stallings and Kaskowitz 1974, Stallings and Mohlman 1981) has provided improved classroom observation methodology and additional substantiation of the time on task theory of learning. Stallings' continual work has resulted in correlational and descriptive data about school effectiveness, including the use of time by elementary and secondary teachers and students in the classroom. Her findings indicate that the mere length of the school day or the length of class in secondary schools is not the critical factor in students' academic achievement. She stated that, "Clearly student learning depends on how the available time is used, not just the amount of time available" (Stallings 1980, p. 11). Stallings has organized a teacher training institute to encourage teachers to spend more time instructing and managing students to stay on task during class time (Stallings and Mohlman 1981).

The notion that increased time on task is the panacea for increased achievement is extremely appealing as a simple solution for more effective academic education. Several researchers have cautioned, however, that the time on task findings should not be interpreted to mean that merely increasing the engaged time will produce more learning for all students. Stallings' (1980) comment sums up others' (Soar 1978, Evertson 1980) views: "For all students, there is a point at which more learning time does not produce more learning" (p. 12).

At this time, there is no known optimum time on task for most students, particularly the less academically successful students. The less successful students need more time to learn than the more successful students (Bloom 1974). Data from Glaser

(1968) and Atkinson (1968) suggest that the slowest 5 percent of learners take about five times as long to reach any given criterion of mastery as do the fastest 5 percent of learners (Borg 1980). A number of studies (Block 1971; Peterson 1972) provide evidence that 80 percent of the students can achieve a level of learning that is usually attained by only 20 percent when there is an increase of 10 to 20 percent in learning time.

Evertson (1980) reported a significant variation in student engaged time among achievement groups. On the average, low-achieving junior high students were engaged 40 percent of the time in academic content compared with 85 percent engaged time for high-achievers. Low-achievers spent more time waiting and doing nothing than did high-achievers.

It appears that the relationship (correlational, not causal) between teacher-allocated time and student-time on task and achievement has been established in the elementary level studies. There is a temptation to apply the time on task findings from the academic elementary classrooms to the secondary level vocational education classroom. It is important, however, to recognize that there may be significant differences between these two areas in their orientation, goals, structure, and student characteristics that may have different ramifications for increasing effective instruction.

In summary, the time-achievement research suggests that teachers should manage class time to provide adequate time for students to be engaged in learning. There is no formula for calculating the precise amount of time required for optimal learning at either the elementary or secondary level, nor is there any one amount of time ideal for all the students in a heterogeneous class. It is apparent, however, that where the opportunity for student time on task is increased there is significant gain in student achievement.

Second Assumption

There are several types of differences--differences between elementary students and secondary vocational education students, differences between lecture-oriented classes and shop/laboratory classes, and differences in the types of subject matter being taught--that can affect the teaching methods most conducive to optimizing time on task in vocational education classes.

Differences between types of students. The most obvious differences are the natural differences in physical growth and mental maturity between elementary and secondary students. Because the attention span of elementary students is short, the time allocated to a particular subject may be only 15 to 20

minutes. In contrast, vocational classes in the study ranged from 46 to 176 minutes in length. Young students may not be able to concentrate for long periods of time on individualized seat work as can older students. The youngest students (grades one through three) are still learning to follow directions and may not have either the reading or comprehension skills to proceed with work on their own. Thus, a great deal of teacher time is required for individualized work. It is during this time when a teacher is working with an individual student or small groups that the rest of the class tends to be off task. At the secondary level, students are able to work for longer periods of time on their own without individualized teacher supervision. Teachers also have fewer managerial duties at the secondary level since such tasks as collecting lunch money, getting dressed for recess or to go home, etc. diminish as students become older and are able to care for themselves.

Differences in class structure. The prevailing teacher-student interaction in academic classes without laboratories or shops, such as those observed in most previous time-on-task studies, is with the teacher lecturing and the students listening and responding. Cusick (1973) described his observation experiences in one high school:

> The fact was, that the teaching in all classes, science, math, English, language was remarkably similar. The teacher would take care of his basic maintenance activity: take attendance, close the door, accept late slips, take out his book and call the page number; then he would structure the activity by acting out the part of questioner, encourager, teller, and explicator, doing, of course, most of what there was to do while the students watched, waited, and responded to his cues. This was the way classes were conducted day in and day out. (p. 28)

Vocational classes usually include a laboratory or shop in addition to a more traditional class component that provides opportunities for related lectures. Most vocational education skills cannot be learned without individual, hands-on practice. A student may learn the theory and the correct safety procedures and memorize the directions, but will develop the actual skill only through hands-on experiences. In vocational education shop or laboratory classes there is usually tangible evidence that a student is mastering the desired competency, and the teacher can often spot problems as a student works. When students are doing individualized work in academic classes it is almost impossible for their teacher to determine if the students are proceeding correctly without actually talking with them or checking their papers. It is easier for students to be off task with a reading or writing assignment and go unnoticed by the teacher than for students to be off task when they are assigned to the lathe or other equipment. Thus, the problems of off-task behavior that

show up with individualized instruction may not apply to vocational classes to the same extent.

Differences in subject matter. Studies of elementary classes have generally focused on basic skills such as reading, math or science. Even in secondary-level studies, classes in similar academic subjects were used as the samples. In many cases remedial English or math classes were studied. Thus for the most part, classes such as physics, journalism, or language that typically include a laboratory component similar to that found in vocational education were not studied. Learning in the lab environment, even in academic classes, is generally individualized or done in small groups, as opposed to all students listening to a teacher's lecture. In some cases, a class such as physics may extend through more than one class period, with classroom lecture held one period and lab held another. This structure is similar to that found in many vocational education classes.

The type of subject matter being taught also affects the managerial or noncontent activities that occur. Lab classes may require time on the teacher's part to check equipment, set up materials, arrange for repairs, etc. Students may also spend time in set up/clean up as part of their learning experiences. Even within regular classes Cusick (1973) found that "generally, in harder classes such as physics, calculus, or literature, the teachers were able to go through these things (managerial activities at the beginning of class) faster because there were fewer deviations; that is, there were fewer students who missed class, missed tests, failed to hand in work, came late, and so forth." (p. 46). Although Cusick provided no rationale, it is possible that there is a self-selection process wherein the "harder" classes are made up primarily of the most capable and/or mature students. If this is true, as has been posited by Stallings (1976), then different pedagogical methods are needed in different classes to yield the same proportion of time on task.

Third Assumption

There are major curricular content areas that should be included in all vocational education programs regardless of the desired outcome goals of the local programs. An unresolved issue in vocational education is the lack of consensus nationally about the desired outcome or goals for secondary vocational education programs. While some policymakers and educators contend that its role is to prepare youth for work after high school, others believe vocational education is a more general preparation for life. These polar opinions have serious implications for national, state, and local policies and funding appropriations for the vocational education of high school students.

Educators, employers, and parents who participated in a recent survey believe that the primary goal of secondary vocational education is to provide students with competencies needed to obtain jobs (McKinney et al. 1981). Other outcome goals that have been listed most frequently in public school vocational education curricula are (1) meeting society's needs for workers, (2) increasing the options available to each student, and (3) serving as a motivating force to enhance all types of learning (Evans and Herr 1978). Farley (1979) listed over 250 possible goals or outcomes that have been supported at some time. Ruff and his associates (1981) provided a rationale for including non-occupational specific outcomes that would lead to increased individual diversity, individual productivity, equity, program accountability, and program implementation. In the absence of a common set of outcome goals, educators generally agree that a diverse vocational education curriculum must be taught to accommodate the different goals held by the various constituencies across the nation.

The lack of consensus about desirable outcome goals has presented an enormous difficulty in determining what should be considered relevant contents for the curricula of a variety of vocational education programs. The identification of relevant curricular content is essential to this study in order to know which activities to record as time on task. A thorough review of the literature yielded a model developed by Campbell and his associates (1981, p. 8) that proved helpful, as did a policy paper by Evans (1981), for determining relevant curricular content areas appropriate for secondary vocational education programs. These curricular content areas were organized into five distinct groups for use in this study. They include (1) basic skills (separate or with technical skills); (2) technical skills; (3) knowledge of the world of work; (4) job seeking, maintaining, and advancing skills, and (5) work attitudes or values. (These five major content areas were defined in the Definition section.)

The five curricular-content areas were used in a tentative mode in this study with the acknowledgment that they could prove to be inadequate for all of the types of contents taught in vocational education classes. They did, in fact, prove to be less discrete or mutually exclusive than initially believed. For example, differentiating among the three curricular content areas of knowledge of the world of work, job- seeking, maintaining, and advancing skills, and work attitudes or values was extremely difficult and often impossible in the classes observed. Similarly, there is no clear division in the literature, as exemplified by the range of effective work competencies identified by Kazanas (1978), the thirty-nine employability skills discussed by Selz (1980), and others' lists that do not divide neatly into the three distinct curricular content areas. Consequently, these three content areas have been collapsed and considered as one catchall category termed "employability skills" in the analysis of the data in this study.

Teachers generally determine what curricular-content areas are included in their lessons, but regional goals or desired outcomes are also influential. Teachers also control the amount of time provided for specific curricular content areas. Therefore, teacher-allocated time determines the upper limits of time students can be engaged in learning specific content areas. Numerous studies indicate a wide range of time allocated for academic instruction and a concomitantly wide range of student engaged time in academic content. Holmes' (1915) finding of the wide variation in time allocated by subject matter in urban elementary schools across the nation has been confirmed by every study conducted to date (Mann 1928; Brady et al. 1977). The differences in actual allocated time suggest that some students have two to four times as much opportunity to learn academic content as other students (Caldwell, Huitt, and Graeber 1982).

Limitations of the Study

This exploratory study is one of the few endeavors to research time on task in secondary vocational education. Since the differences between academic and vocational classes may have important implications for instruction, the purpose is to provide foundation data about time usage in vocational education classes. The reader is therefore encouraged to explore the findings as a means of generating research hypotheses for further studies.

Prior to this study, there were no instruments or guides available for recording time on task specifically in vocational education classes, shops, and laboratories. While Stallings' (1981) Secondary Observation Instrument lists vocational education as a subject identifier, neither the "material" nor the "activity" identifiers designate specific content areas in vocational education. Thus, observation guides were developed specifically for this study. Although the observation guides were carefully designed and revised after pilot testing, they should be regarded as developmental rather than final versions.

The issue of statistical significance must also be considered. The ten classes that participated in the study were selected purposively, rather than randomly, which is not the kind of sample required for the use of tests for statistical inference. One reason for the purposive sample is that over 6,000 secondary schools in the United States offer at least six vocational education courses. A random sample of these, within 5 percent of the true population value, would have included 352 schools. By dropping the confidence level to 10 percent, the project staff would have included 95 schools in the sample. Either sample size would have been prohibitive for the resources available for the study. More importantly, the intensive observation required to collect two weeks of time in each class precluded studying a large number of classes. Therefore, ten

classes from three federally funded program areas (agricultural education, marketing and distributive education, trade and industrial education) were selected through various steps described in the methodology section.

Another limitation of the study is that the time of the year when observations were made is not necessarily representative of how time is spent throughout the school year, September to early June. Because of scheduling constraints, the observations were conducted during March and April, close to the end of the school year. Several teachers cautioned that "this is not the best time in my class to see what we teach--we've already had most of the theory and are now working on individual projects." While the results indicated no significant differences (at the .05 level) between the weeks observed in March and April, it is possible that there could have been significant differences among weeks observed in September, December, April, and June.

The reader is cautioned, therefore, to avoid attributing the results of this study to vocational education in general. Vocational education is extremely diverse. There is considerable variance among secondary schools, communities, governance, populations served, and goals for vocational education. With these caveats in mind, the results of this study serve as an unprecedented data base of time spent, minute to minute, by 186 students and their teachers during two weeks in ten classes representing three vocational education program areas.

Organization of the Report

Following this introductory chapter, the methods and procedures used in the study are described in chapter 2. Chapter 3 presents the findings and conclusions, along with a description of the ten classes observed in the study. Implications are discussed in chapter 4, which includes a brief summary and recommendations for further research. Appendix A contains the observation guides developed for this study. The tables and figures not included in the body of the report are included in Appendices B and C. Appendix D contains abstracts of over fifty time-on-task studies.

CHAPTER TWO

METHODOLOGY AND PROCEDURES

Rationale

Since the project staff believed, as Karweit and Slavin (1980) proposed, that methodology can influence the results of time-on-task studies, the direct observation method was selected to gather the data. Lomax and Cooley (1979) asserted that the direct observational technique using outside observers is probably a better procedure for collecting instructional time data than are teacher-kept logs and observations by other school staff.

In order to assess the effects of methodological differences among time on task studies, Karweit and Slavin (1980) conducted a study wherein they manipulated the definition of off task behavior, length of the observation visit, days of observation, the scheduling of observations, and the sampling of students for the observation. The results of their study indicated that altering the definition of time on task to include momentary time off task affected the conclusions for the importance of time on task. In this study, momentary time off task was most likely to be recorded as on task simply because it happened more quickly than the minute-to-minute observation detected. Students who were observed off task were recorded as such, especially by the observers using the more sensitive student observation guide.

Karweit and Slavin (1980) found that sampling segments of class time obscured the positive results for time on task because there was great variability among classes and even within classes in the timing of the on-task activities. In this study, the entire class periods of ten classes were observed ten times apiece as opposed to sampling segments of many classes. Thus, the ebb and flow of time on and off task were recorded, and no assumptions had to be made about whether a segment of time represented the whole class period.

To determine the wisdom of the conventional dictum that ten days of observation is a sufficient number for accurate portrayal of a class, Karweit and Slavin (1980) tested the reliability of collecting observation data during five to eighteen days. They found the greatest reliability and the greatest effects for time on task for the sets of observations collected during the longest period of time. As Lomax and Cooley (1979) pointed out, however, most researchers use a convenient sample of time in terms of budget, personnel, and other resources. In this study the constraints of scheduling with several school systems, the availability of resources, and the need for including a variety of

classes representing at least three program areas precluded observing more classes. Consequently, ten entire class periods were observed in each of the ten classes. The one exception was a machine shop class (35353), where parent-teacher conferences were held during one of the scheduled days. This exception resulted in nine rather than ten days of observation in that class.

Before conducting their study, Karweit and Slavin (1980) believed that there are more and less intensive periods of instruction throughout the school year. They found, however, little difference in time on task between classes observed in February and May. Based on their extensive review of the literature, Lomax and Cooley (1979) proposed, on the other hand, that if one had twenty days for observation, two days per month over ten months would be more generalizable than four weeks during one month. Lomax and Cooley urged that additional research be conducted to determine the optimal amount of time and the optimal timing of the observations for generalizability to an entire school year.

Evertson and Veldman (1981) also found significant differences among the months of observation. In their study, student attention gradually increased from November to a peak in January and then fell through April. Student-to-student interaction also sharply rose in April. Cognitive-level student behavior was higher in the first three months than in the last three. Students participated in class activities less frequently during the last months than during the first three months. Therefore, despite the conclusions from Karweit and Slavin's study in elementary classes that timing does not make much difference, the timing issue was tested to a limited degree in this study. While the fieldwork had to be conducted in March and April, a three- to four-week interval was scheduled between the two weeks of observations in each class to determine whether nonconsecutive weeks would produce different proportions of time on and off task.

Sample Used

Selection of Classes

The ten classes were selected purposively for participation in this exploratory study. As explained in the discussion about the limitations of the study, a random sample would have been prohibitively large for the resources available and the direct observation method used to collect the data. To select the classes it was first determined that classes representing three of the ten vocational education program areas (as identified by the Vocational Education Data System) would be observed in order to have the opportunity to compare similar classes. Three program areas--agricultural education (AG), marketing and distributive education (MDE), and trade and industrial education

(T & I)--were selected. These three programs had a combined enrollment of approximately one-fourth of the secondary vocational education students during the 1979-1980 school year (Golladay and Wulfsberg 1981).

The criterion for the selection of the four states was their promximity (for budget purposes) and the vocational education state directors agreement for participation. The state directors recommended local school systems located in either a rural, urban, suburban, or inner-city site that had at least five vocational program areas. The local directors of vocational education, in turn, recommended several schools that had AG, MDE, and/or T & I programs. Throughout the selection process, the project staff requested typical, as opposed to exemplary, classes. With unavoidable scheduling conflicts, resource and time limitations, spring vacations, and other constraints contributing to the process, the final selection resulted in the ten classes displayed in figure 1.

Program Area / Type of School	Agricultural Education	Marketing and Distributive Education	Trade & Industrial Education	Total Number of Classes
Comprehensive High School	1 rural	1 urban 2 suburban		4
Area Vocational	1 urban	1 inner-city	1 suburban 1 rural 1 urban 1 inner-city	6
Total number of classes	2	4	4	10

FIGURE 1. DISTRIBUTION OF CLASSES BY PROGRAM AREA, TYPE OF SCHOOL, AND TYPE OF SITE PARTICIPATING IN THE STUDY.

As shown in figure 1, the classes were not distributed evenly in the cells configured by the type of school and the program areas. There were no T & I classes offered in the comprehensive high schools in any of the school systems that met the other selection criteria and that agreed to participate. There were two classes at the rural site, three at the urban site, three at the suburban site and two at the inner-city site. At all but the rural site, two different types of schools--a comprehensive high school and an area vocational school--were included.

After concluding their observations, the project staff characterized the ten classes as "typical," basing their opinion on their previous experiences as teachers and researchers. While many different types of activities occurred during the ninety-nine class periods observed, all could probably occur in vocational education classes across the country at one time or another. Some examples of these nonroutine activities included a regional conference, a field trip to a local college, and an assembly held to confer awards for VICA (Vocational Industrial Clubs of America) and DECA (Distributive Education Clubs of America).

Selection of Individual Students

Three individual students were selected during the first fifteen minutes of the first class period observed in each class. There were several reasons for the on-the-spot selection as opposed to a selection prior to the first class based on competency levels or other criteria. First, there were no pertinent records available (competency tests, etc.) that would classify students consistently across all of the ten classes. Nor was it practical to test the students because of the extensive clearance procedures necessary. Asking the teachers to recommend three students by some criteria (grade, etc.) would have caused the teachers to be especially aware of those students and perhaps be more attentive to them. Obtaining recommendations from an administrator or guidance counselor was also not practical because the observers had no way of knowing the students' names. Consequently, the observers using the student observation guide were instructed to select three students who appeared to be representative of the class in sex, race, apparent motivation, and skill level.

Instrument Used

Description of the Observation Guides

A class observation guide was developed to record the classroom activities of all the students and the teacher in a class during each minute (Appendix A). This guide and its companion, the student observation guide for observing individual students

(Appendix A), were both designed for recording fifteen minutes of class time. For example, if the class being observed was 125 minutes long, then eight and one-third sheets of the class observation and student observation guides were used for each day of observation. Each of the two observers used only one type of guide throughout the study, and this practice, it was believed, increased their proficiency and reliability.

The observation guides were designed to eliminate the need for recoding or transcribing the data for keypunching. Since the data were keypunched directly from the completed observation guides, potential errors in transcription were avoided and time was saved.

Codes Used

The class observation guide was used to record all the students' and the teacher's activities in a class. The first fourteen columns were used to record the minute, the date, the codes for the observer, the site, the school, the service area, the name of the class and the grade or grades of the students enrolled. The numbers of students engaged in specific curricular-content areas were recorded in columns 15 through 36. The content areas, which are defined in chapter one, included the following:

- Basic skills with technical skills (columns 15-20)

  Reading
  Calculation
  Writing

- Basic skills separate (columns 21-26)

  Reading
  Calculations
  Writing

- Technical skills (columns 27-30)

  Theory
  Practice

- Job-seeking, maintaining, and advancing skills (columns 31-32)

- Knowledge of the world of work (columns 33-34)

- Work attitudes and values (columns 35-36)

The numbers of students involved in noncontent, although not necessarily off task activities were recorded in columns 37 through 56. The noncontent areas included the following:

- Waiting/nothing, without socializing, (columns 37-38)
- Socializing (columns 39-40)
- Listening to announcements about related information (columns 41-42)
- Setting up for work in the lab or shop (columns 43-44)
- Cleaning up after work in the lab or shop (columns 45-46)
- Being disciplined by the teachers (columns 47-48)
- Out of room in a related academic activity, such as tutoring in math or English (columns 49-50)
- Out of room in a nonrelated activity such as a visit to the restroom (columns 51-52)
- Conference with teacher (columns 53-54)
- Taking a break (columns 55-56)

The break code was used to record either officially scheduled breaks, which in some school systems were mandatory or those spontaneously announced by the teacher. The observers agreed after they had concluded the observations that "goofing off" should have been coded separately. Much of the socializing time would have been better described as "goof-off time," such as when some students played cards or threw wads of paper at each other. Setting up was recorded as time on task because it is an important aspect of working that is learned in vocational education laboratories and shops. Similarly, cleaning up is a vital part of learning how to do a job. Using safety precautions and having good work habits, which are considered by some educators to be important outcomes of secondary vocational education, were subsumed in both setting up and cleaning up (McKinney et al. 1983).

The teacher's activities were recorded in columns 57 through 62. The curricular-content area addressed by the teacher was indicated with a code number in columns 57-58. The codes for the teacher's content were synonymous with the content codes for the class except for the eighth one.

01 Basic skills with technical skills

02 Basic skills separate

03 Technical skills - theory

04 Technical skills - practice

05 Job seeking, maintaining and advancing skills

06 Knowledge of the world of work

07 Work attitudes and values

08 Other, management, transition or noncontent

The methods used by the teacher were indicated in columns 59 through 62. At least one method was recorded during each minute. In cases where two methods were used simultaneously, such as lecture with audiovisuals, a second method was indicated in columns 60-62. The codes for the teacher's methods are listed below:

09 Lecturing

10 Leading discussion

11 Demonstrating

12 Using audiovisuals

13 Giving directions/instructions to the class

14 Providing individualized instruction (to one student or a few)

15 Testing or quizzing, either orally or by supervising written tests or quizzes

16 Making assignments for classwork or homework

17 Writing on board or drawing diagrams

18 Checking out tools or equipment from the tool crib, etc.

19 Securing materials out of class such as pieces of metal, etc.

20 Passing out materials to the students

21 Observing students at work in class or shop by walking around or sitting at desk

22 Grading papers or projects

23 Working at desk or station in classroom

24 Working in adjoining office, usually with glass partition

25 Being out of classroom

26 Waiting/walking between rooms

27 Passing out or collecting papers

28 Talking with other staff by telephone or in person

30 Repairing equipment/tools

31 Asking/answering questions

32 Other

While there were not enough codes to distinguish the numerous methods or activities of the teachers observed, the observers agreed that fewer codes would have been sufficient to capture the essence of the methods. One reason for using so many codes was to collect information about the variations in teacher behaviors in vocational education classes as a foundation for further research.

The student observation guide was used to record three individual students' activities (Appendix A). The activities of the three students were recorded in the columns identified for student 1, student 2, or student 3. The codes used for recording the individual student's activities were more specific than those used for all the students on the class observation guide. Using the student observation guide also provided a sequential record of specific students' activities throughout their class time and during two weeks. Developing this sequential record was not possible with the class observation guide.

As in the class observation guide, the first fourteen columns in the student observation guide were used to record the minute, the date, the codes for the observer, the site, the school, the service area, the name of the class, and the grade or grades of the students enrolled. The basic skills that were addressed separately, whether reading, computing or writing, were indicated with a check mark in columns 15 through 23. The content and noncontent areas addressed by the students were indicated with a code for the method used by the students. The codes for the student methods included the following activities:

01 Setting up for work

02 Practicing skills

03 Listening or observing

04 Reading

05 Computing

06 Writing

07 Combining basic skills

08 Answering or asking questions

09 Discussing (participating)

10 Taking notes (lecture or audiovisual)

11 Using audiovisuals

12 Working (related) at another location

13 Being in another class (math, etc.)

14 Setting up a display

15 Helping another student

16 Being helped by another student

17 Supervising others' practice

18 Cleaning up

19 Being disciplined

20 Waiting or doing nothing

22 Socializing

23 Other

24 Other

Technical skills, whether theory or practice, were recorded in columns 24 through 35. Job-seeking, maintaining, and advancing skills, knowledge of the world of work, and work attitudes or values were recorded in columns 36 through 53. Noncontent activities were recorded in columns 54 through 59.

Validity and Reliability

Direct observation of students and teachers was selected as the best method for studying how time is really spent in vocational education classes. Numerous potential problems with

validity and reliability are inherent in using direct observation techniques, however. The validity and reliability of the two observation guides developed for this study were considered in several ways.

Validity. According to Kerlinger (1973), the important aspects of the validity of observation measures are their construct validity and predictive powers. In other words, are they dependable predictors of relevant variables? Kerlinger contended that if the variables being measured with the observation guides are embedded in a theoretical framework, then certain relationships should exist. One assumption in the framework of this study is that there are major curricular-content areas that are included in all vocational education programs. Another assumption is that there may be differences between academic and vocational education classes in the kinds of activities that are relevant. Both of the observation guides (class and student) included codes for five major curricular content areas and a wide range of activities known to be appropriate for students and teachers in vocational education classes. These codes were tested through pilot tests in AG, MDE, and T & I classes. The codes were subsequently revised to reflect the real-life classroom situations encountered in the pilot test classes. New codes were also added to represent previously unforeseen activities.

The pilot tests enabled the observers to check their ability to relate what happened in the classroom or shop with the coded activities in the observation guides. Through discussions of the results of the pilot test, the observers clarified their interpretations of the codes for consistent coding at the study sites.

Observer Interference. Kerlinger discounted the problem of observer interference by pointing out that observers have little effect on the situations they observe because people adapt quickly to the observer's presence and do what they usually do. "Indeed," he said, "it is more of a problem to the uninitiated who seem to believe that people will act differently, even artificially when observed" (1973, p. 538). The classic example is the belief that teachers will act in an unaccustomed, exemplary way when being observed. While this behavior may be true in some cases, it should be realized that teachers cannot do what they have not learned to do (Ryans 1960).

Observer Reliability. While negating observer interference as a major problem in direct observation studies, Kerlinger believed that observer reliability is a potential problem: "The observer must digest the information derived from observations and then make inferences about constructs.... The strength and the weakness of the procedure is the observer's power of inference" (1973, p. 538). According to Medley and Metzel (1963), the observer should use the least inference possible in describing whether a behavior occurred.

In order to reduce inference, the observers in this study made judgments each minute to determine which specific type of activity was occurring. They used code numbers for specific activities but also had the opportunity to record activities that did not have a code number. The classification of the activities was predetermined as on task/content, on task/noncontent, or off task. In some cases, the designation of a category was made a posteriori through analysis of the observation data. Either way, the observers did not have to decide whether the activity was on task.

Reliability among observers. Flanders (1967) commented that "the ideal observer team is a group of like-minded individuals who will respond consistently with the same category number when presented with the same communication events" (p. 158). In this study, the problem of reliability among observers using the same observation guide was minimized with the use of a limited number of observers in the field. A total of five observers collected all of the observational data, with two using only the class observation guide and three using only the student observation guide.

To assess the reliability of observers using the same instrument, an interrater reliability check was conducted after the observers had been trained and the observation guides had been revised into their final form. The most commonly used procedure of assessing observer reliability, paired observation, was used (Stallings 1977). The observers were situated in the same classroom or shop and coded the same activities simultaneously. The five observers used their respective observation guides (either class or student) to code their observations in two classes for two days at an area vocational school. The two classes, one in the MDE program and the second in the T & I program, were approximately three hours long.

The recorded codes were analyzed with the Pearson product-moment correlation coefficient to determine the reliability among the observers using the same observation guide. A correlation coefficient was computed for the time spent on several types of curricular content areas as well for time off task. The results, as displayed in tables 57 and 58 (Appendix B), indicate a relatively high degree of correlation at the 0.00 level with one exception. As shown in table 57, there was a high degree of agreement in coding basic skills (.96), employability skills (1.0), set up/clean up (.86), and off task (.87) among the observers using the student observation guide. The observers did not, however, have as high a degree of agreement in coding the technical skills (.58) practiced or discussed in the classrooms. In table 58 the correlation coefficients indicate that there was a relatively high degree of agreement (.73/.77/.90/.94/.94) among the observers using the class observation guide for all five of the on-content and off-task activities observed.

Flanders (1967), who is perhaps the best-known classroom observer, has felt that a coefficient of .85 or higher is a reasonable level of correlation among observers. The low (.58) reliability coefficient for technical skills on the student observation guide in this study indicates a need for more observer training, a less complicated instrument, or more discrete codes. It is interesting to note that the results of the interrater reliability assessments for this study compared favorably with those reported by Stallings (1977) and Sirotnik (1982) for their respective studies. Stallings (1977) included extensive reliability assessments in her studies of time in classrooms, with the interrater reliability coefficients ranging from .44 to 1.00. Sirotnik (1982) computed interrater reliability for all secondary classes in his subsample and found correlation of .83 and .79.

Reliability between observation guides. With two different types of observation guides (class and student) used in the study, their congruence for recording observations constituted another question of reliability. In other words, did the observations recorded in the student observation guide correlate with those recorded in the class observation guide? The potential problem was one of specificity because the student observation guide was used for very close tracking of three students in each class, while the class observation guide was used for recording the activities of all the students and the teacher. The observer using the student observation guide had to be very exacting about the three individuals' activities whereas the other observer, using the class observation guide, had to count the number of students doing the activities during each minute of class time.

A t-test was conducted to determine if there were any significant differences between the results of the two observation guides. The class with seven students was dropped from this analysis because of the low enrollment. In the other nine classes which had between fifteen and twenty-six students, the means of the three students in each class were compared with the their class' means of minutes spent on task, on basic skills, on technical skills, on employability skills, off task, on set up and clean up, and for absence. As shown in tables 15 through 21 (Appendix B), the t-tests indicated no significant differences at the .05 or .01 level between the three students in each class and their respective classes for any of these categories except absence. There was a significant difference at the .00 level in absence between the three students and their respective class, which was expected due to the variability of individual students in absence from class. It appeared from the results of the t-tests that the observations recorded on the two types of guides were congruent with each other.

It appears that, for the most part, the observers used the two types of observation guides to record similar proportions of time on and off task in vocational education classes. The agreement between the two different observation guides ranged between .58 and 1.00 for recording time on and off task. While the correlations coefficients obviously cannot be averaged, it can be inferred that the time off task coefficients (.87 and .90) are indicators of the total time on task coefficients for the two different guides.

Field Procedures Used

Pilot Test

The first drafts of the observation guides were used in a pilot test at a local area vocational school. The field procedures and the process of recording observations every minute were tested in four different types of vocational education classes.

The project staff assigned to collect the data in the field participated in the pilot test. They used the specific version of the observation guide (student or class) they would use in the field. After the pilot test, the two observation guides were revised for use in handling and to include more specific codes. The recording of the observations every minute was retained because the project staff found it comfortable--not too taxing nor too boring--for the long class periods observed. They found the codes relatively easy to remember and recorded the observations in a few seconds of each minute they observed.

Data Collection

At the four study sites the teams composed of two observers attended their classes located at one or two different schools. Prior to the first class period observed, the two observers talked briefly with the teacher to explain the procedures of the observations and to answer any questions the teachers might have. The teachers did not express concerns about having the observers in their classes or shops. The observers explained that they would move with the students--from classrooms to shops to remote areas--in order to record the students' activities accurately. The observers asked the teacher to ignore them as much as possible and not to accommodate them by, for example, asking students to bring them chairs in the shop area. The teachers, in turn, requested that the observers comply with the safety rules by wearing safety glasses and following other safety precautions in the shops. In all situations the observers were as inconspicuous and unobtrusive as possible. They sat at the back of classrooms during lectures and quietly moved around in the shops or laboratories. To illustrate, in the Agricultural Mechanics (11115) shop, the floorspace was crowded with combines, tractors and other large pieces of farm equipment in various stages of repair.

The observers moved among the farm and repair equipment in order to record the students' varied activities--some students were under machines, others were in welding booths--while avoiding sparks from welders, grinders, and other tools.

The observers counted and recorded student activities while scanning the classroom, laboratory or shop. While some activities, such as practice of technical skills, continued for several minutes, other activities occurred very briefly. For the most part, the observers recorded the activity they viewed as they scanned the room. However, if students were working on a lathe and looked away for an instant while the observer looked their way, they were recorded as working on the lathe (technical skills/practice). On the other hand, some activities which also occurred relatively briefly, such as calculating the length of a pipe to cut, were indicated when observed (basic skills with technical skills/calculating).

Students who left the classrooms during the scheduled class time created a challenge for the observer's accurate coding. In some cases when the observer heard students request permission to leave or saw them entering a restroom located in the shop area, the coding was easy (out of room/nonrelated). In other cases, the students were recorded as out of the room/nonrelated until the observer could find out differently from overheard remarks or by asking the teacher after class. In one class, the teacher explained that a student in question left for forty minutes every day for tutoring in math and English. This student was recorded as out of room/related or academic for that period of time.

In most classes, especially after the first day of observation, the students and teachers did not appear to be disturbed or motivated by the presence of the observers. The observers found that, initially, students and teachers were shy about approaching them with questions. After a few days, however, a few students asked the observers "What are you checking?" or "How are we doing?" Some of the teachers were quizical on occasion as well. The observers made a concerted effort to avoid one teacher who seemed more interested in talking with them than in teaching the class. The observers tried to avoid conversations with the students and teachers in a friendly, but firm, manner by briefly explaining they had to record activities during every minute. Some students and teachers, therefore, initiated conversations before or after class which allowed the observers to respond to them in a relaxed, conversational manner.

While recording the activities, the observers also noted unusual circumstances or quoted teachers and students to illustrate and elaborate the coded activities. With the notes elaborating the coded activities, analysis of the activities occurring in schools was more precise and realistic. The richness of details

added by the notes provided descriptions for the ways class time was spent and how classes were similar and different from each other.

Analysis of Data

Unit of Measure

The minute was used as the primary unit of measure. All data were collected in numbers of minutes spent upon various on and off task activities in the classes. The proportions (or percentages) of on and off task activities were calculated with the following formula:

$$\frac{\text{number of minutes spent on the activity}}{\text{total number of minutes present in the class}} = \text{proportion of time}$$

Thus, for example, in a 46 minute class with fifteen students present, the denominator was 690. If the fifteen students spent a total of 465 minutes on task during the class period, there was 67 percent time on task. The equation was:

$$\frac{15 \text{ students} \times 31 \text{ minutes} = 465}{15 \text{ students} \times 46 \text{ total class minutes} = 690} = .67$$

It is important to note that the formula was applied for the number of students on task during each minute with the number of student minutes on task cumulated throughout each class period.

Collapsed Codes

A number of the codes used in the observation guides were collapsed for more concise analyses and discussions of the results. This was necessary since there was an extremely small amount of time recorded for some of the content codes. Figure 2 displays the codes listed on the observation guides, the new collapsed categories used for the analyses, and the classification used in the discussions.

The three classifications indicated in figure 2 are on task, either content or noncontent, and off task. On task/content includes the three collapsed curricular-content categories of basic skills, technical skills, and employability skills. On task/noncontent includes the set up/clean up and the related categories. Off task includes the waiting/nothing, the socializing and the break category. The purpose for such specificity was to prevent any misunderstanding since the literature is replete

Codes Used in Observation Guides	Collapsed categories Used for Analysis	Classification Used for Discussion
Basic skills with technical skills: reading, calculating and writing Basic skills separate: reading, calculations, and writing	A.[1]Basic skills	On task/content
Technical skills: theory or practice	B. Technical skills	On task/content
Job-seeking, maintaining, and advancing skills Knowledge of the world of work Work attitudes and values	C. Employability skills	On task/content
Waiting/nothing, socializing	D. Off task	Off task
Setting up, cleaning up	E. Set up/clean up	On task/noncontent
Listening, conference with teacher, out-of-room related	F. Related	On task/noncontent
Taking break, out-of-room nonrelated	G. Break	Off task

FIGURE 2. COLLAPSED CATEGORIES AND CLASSIFICATIONS OF CODES USED FOR ANALYSIS AND DISCUSSION

[1] Letters denote code on pie charts.

with many variations in the meaning of time on task. It is also important to remember that the students' time is under discussion as being on task or off task in this study. The teacher's time is discussed as on or off content or as allocated time.

Statistical Methods

Comparisons between or among the weeks, programs, days of the week, and other variables were calculated with t-tests and F-tests. In cases where significant differences were found at the 0.00, 0.01, and 0.05 levels, the Student-Newman-Keuls procedure (Nie et al. 1975) was used to discern homogeneous subsets. The Student-Newman-Keuls was selected for the a posteriori tests because it yields more significant results than the Scheffe or Tukey tests but is less conservative than the Duncan test for individual comparisons (Winer 1962).

Pearson product-moment correlation coefficients were calculated to determine the interrater reliability of the two observation guides. The Pearson coefficients were calculated at the 0.00 level to provide the best estimate of reliability between the different observers using the observation guides.

Additional Factors Considered for Analysis

Absence

The formula for determining the proportions of time does not include in the denominator the number of minutes absent or tardy. The rationale for excluding absence and tardiness from the formula lies in the reality that educators have virtually no control over student absence or tardiness. Absence from class is critical, however, because the time spent in school is the upper limit of the time students have the opportunity to learn.

According to Rutter et al. (1979), pupils attending 75 percent or more of school time had higher exam scores than students who did not. Stallings and Mohlman (1981) feel that "attendance is becoming a bigger and bigger problem in today's high schools. Clearly, teachers cannot reach students who do not appear in class" (p. 5). In addition to absence, tardiness is also a severe problem.

Therefore, absence (which includes minutes tardy) is reported in the tables and figures to indicate the time lost for learning in the classes observed. For example, as shown in table 3, student 1 and student 2 in the fashion merchandising class had 79.5 and 79.8 percent time on task/content respectively. Student 2, however, had 20.3 percent absence compared to 0.0 percent for student 1. While it can be assumed (because the reported proportions are averages of the time present) that student 2 would have

had similar time on and off task if he/she had not been absent, it is nonetheless important to note that student 2 had less actual opportunity to learn than student 1.

Interruptions

Stallings and Mohlman (1981) found that fewer students were on task in secondary classes where there were frequent interruptions from the loudspeakers or from tardy students. There were also more teacher corrections for behavior in classrooms with frequent interruptions. Not only was time lost due to interruptions, but it took additional time for students to return to their on-task activities after each interruption.

While there were very few incidents of time lost for discipline in this study, there were numerous interruptions in some classes. One of the recommendations made by Stallings and Mohlman (1981) was that the school make a concentrated effort to reduce interruptions. Often administrators fail to realize how many interruptions actually occur and how the effects can accumulate.

The two classes with the lowest percentage of time on task (22233, 51 percent and 246273, 50.7 percent) tended to have numerous interruptions throughout the class periods. Class 22233 averaged 4.3 observed interruptions during the 56-minute class period. Class 246273 averaged 3.2 observed interruptions during the 111-minute class period. By contrast, the classes with the highest time on task (11115, 82.4 percent and 35353, 84.4 percent) averaged less than one interruption per class period each day.

In this study interruptions were defined as public address announcements, tardy students entering, other students or staff entering, fire drills, or phones ringing which required a student or teacher to answer. Students and staff members who left the room were not considered an interruption since theoretically they could leave without being noticed. Breaks taken as a group also were not counted. Students arriving late, and students and teachers from other classes accounted for the largest number of interruptions in the classes with low rates of time on task. Another source was public address announcements that occurred throughout the periods, causing several interruptions rather than one at the beginning or end of class. There were fewer tardy students in the classes with high rates of time on task so the number of interruptions was reduced considerably. These two classes used highly individualized instruction so that interruptions affecting one student--for example, an athletic coach coming in to talk to a student--did not appear to affect the rest of the class.

In several classes students left for tutoring or remedial sessions. Although their departure did not interrupt the rest of the class, it did reduce their available time on task in the vocational class. In this study, students were considered on task (out of classroom/related) if they were being tutored, since that was their assigned task. However, a question could be raised as to the effects of these legitimate interruptions on learning the content of the vocational education class. Since student achievement was not a variable in this study, the effects of such interruptions could not be determined. If students attending the remedial classes were having difficulties learning content, they may have been the very students that required more time, not less, to achieve mastery in their vocational subject.

CHAPTER THREE

FINDINGS AND CONCLUSIONS

The questions listed in Chapter 1 were answered using information collected during 11,400 minutes of observation in the ten classes. Since there were two observers in each class, a total of 22,800 minutes was recorded in the field. The observations recorded on the class observation guide were analyzed separately from those recorded on the student observation guide. The majority of the questions were answered through the analysis of the data collected with the class observation guides.

Descriptions of the Classes

The ten classes observed in the study were located in seven schools at four sites: rural, suburban, urban, and an inner-city. Table 1 provides an overview of each class, its enrollment, length, type of curriculum, teacher characteristics, type of school and other pertinent information. As indicated in table 1, four of the classes were in comprehensive high schools and the remaining six were in area vocational schools. While junior or senior secondary-level classes were observed, one class included an adult Comprehensive Education and Training Act (CETA) trainee. Four of the classes were in trade and industrial education (T & I) programs, four in marketing and distributive education (MDE) programs, and two in agricultural education (AG) programs.

Of the total 186 students observed in the study, 22 percent were members of minority groups. The minority students were concentrated in the inner-city classes, with one of the two classes reporting 71 percent minority enrollment and the other, 100 percent. Half of all the ten classes reported no minorities enrolled. About a third of the total number of students, or 32 percent, were female. Only two of the females were enrolled in programs outside of DE. One was in a machine trades class at an area vocational school and the other was in a vocational agriculture class at a comprehensive high school.

Four of the ten teachers were female and all but one taught MDE classes. The one minority teacher was female and taught MDE in an inner-city school. With one exception, the teachers had at least one year's experience working in industry. Half of the teachers had ten years or more of industry experience while the other half had four years or less. Three of the teachers had ten years or more teaching experience while the other seven had been teaching six years or less.

TABLE 1

OVERVIEW OF CLASSES OBSERVED IN STUDY

Program Area	Class (Study Code)	Grade Level	Enrollment			Class Length in Minutes	Type of Curriculum	Teacher				Type of School	Type of Site	Other Information
			Total	Minority	Female			Sex	Race	Years in Industry	Years in Teaching			
Agricultural Education	Agricultural Mechanics (11115)	10-12 Adult	15	0	0	122	State and locally developed; competency-based	M	White	10	12	Area VocEd	Rural	o substitute for 2 days o FFA conference 1 day during class-time
Agricultural Education	Vocational Agriculture (22143)	11 & 12	17	0	1	56	Competency-based	F	White	0	1	Comp. High School	Urban	o 1 mainstreamed handicapped student o substitute for one day
Marketing and Distributive Education	Distributive Education (22233)	11 & 12	25	8	18	56	Not specified by teacher	M	White	35	10	Comp. High School	Urban	o 1 mainstreamed handicapped student
Marketing and Distributive Education	Fashion Merchandizing (34263)	11 & 12	26	26	20	126	Locally developed and IDEC developed; competency-based	F	Black	1	2	Area VocEd	Inner-city	o 3 mainstreamed handicapped students
Marketing and Distributive Education	Marketing & Distribution II (46273)	11 & 12	24	0	13	111	Competency-based	F	White	4	5	Comp. High School	Sub-urban	o 2 mainstreamed handicapped students o substitute for 2 days
Marketing and Distributive Education	Marketing & Distribution IV (46282)	12	15	0	6	46	Competency-based	F	White	4	5	Comp. High School	Sub-urban	o 1 mainstreamed handicapped student o substitute for 2 days
Trade and Industrial Education	Autobody (47391)	11	26	1	0	176	Competency-based	M	White	13	1	Area VocEd	Sub-urban	o 9 mainstreamed handicapped students
Trade and Industrial Education	Machine Trades (11323)	11 & 12	15	1	1	125	Locally developed; competency-based	M	White	22	6	Area VocEd	Rural	o substitute for 2 days
Trade and Industrial Education	Machine Shop (23324)	10-12 Adult	16	0	0	176	Competency-based	M	White	12	15	Area VocEd	Urban	o 1 mainstreamed handicapped student
Trade and Industrial Education	Machine Shop (35353)	11 & 12	7	5	0	146	Locally developed; competency-based	M	White	4	1	Area VocEd	Inner-city	o no school one Wednesday; only nine dyas observed in total

Class length ranged from 46 to 176 minutes, with the longest classes at the area vocational schools. Policies regarding breaks varied, with some mandatory, others announced at the teachers' discretion, and some taken by students individually. In all shop or laboratory classes, the students had access to restroom facilities in or adjacent to the shops or laboratories.

Several of the classes had students classified as mentally or physically handicapped who were mainstreamed. It was difficult, however, to know from observation who these students were or how much they were learning.

A limited-English-speaking student enrolled in the rural machine shop class did not seem to understand what was happening or to participate in many of the class activities. Much of that student's time was spent standing around and waiting unless the teacher provided individual instruction. In several classes the mainstreamed and the limited English speaking students received tutoring or participated in remedial classes during the time allocated to their vocational classes, so their opportunity to learn vocational skills was reduced. The MDE classes seemed to have more of these types of interruptions, which typically precipitated an increase in socializating among the students.

Several nonroutine events that are typical of what does happen during a school year occurred during the weeks observed. One of the machine shop classes was visited by the regional accreditation team. In another school the students were very excited because they were being dismissed early to attend the basketball finals. In one school, the second week of observations was conducted immediately after the spring break and students took longer to settle down to work on that Monday. At the rural school the regional FFA (Future Farmers of America) meeting and contests were being held. These affected all class activities for several days while students practiced their individual skills and organized the competitive events. At all the schools, fire drills, field trips, assemblies, substitute teachers, and late buses were just a few of the typical but not routine events that the observers encountered. These events were coded in many cases as on task/noncontent because they were relevant learning experiences although not specifically on content.

The ten participating classes were selected purposively as discussed in chapter 2 of this report. Three of the classes were machine shop classes, which created an ideal group for comparison. These were located in area vocational schools at rural, urban, and inner-city sites. The machine shop classes ranged from 125 to 176 minutes in length. All were taught by white male teachers with several years of industrial experience. Enrollment ranged from seven students in the inner-city class to sixteen in the urban school class.

The inner-city machine shop was equipped "better than many commercial shops" according to a retired tool and die maker who served as a volunteer aide at the school. The school was new and considered a show place. Tour groups passed through the machine shop almost daily. Consequently, the students were so accustomed to visitors that the study observers were scarcely noticed. Students punched a time clock at the beginning and end of class and the power often had to be turned off to force them to take a break. The curriculum was competency based, with 96 tasks or competencies to be mastered during the school year. However, two students who seemed skilled when working with the tools and machinery appeared unable to read adequately. They needed the teacher's assistance to read the competency sheets, instructions, and operating manuals. One of these students, who was being tutored in reading and mathematics, appeared to be especially motivated and completed a number of competencies with a high degree of proficiency, according to the teacher.

The curricula in the other two machine shops were competency based as well, according to the teachers' reports. There was little evidence, however, of competency-based worksheets or charts in the rural class where students worked on individual projects at their own pace. The students in that class appeared to work best when the teacher circulated and provided help to individuals or small groups. The students frequently socialized or did nothing when the teacher stepped out of the room, worked in his adjoining office, or concentrated on work at his desk in the shop.

In the other machine shop classes (urban), the students appeared less dependent upon the teacher's presence to remain on task because they were intent upon reaching their individual competency goals. The teacher in this class appeared to have a clearly defined set of competency expectations for the students. The class was somewhat unusual because it was open-entry open-exit, so the competency-based curriculum was critical for instruction and student progress.

Set up and clean up were time-consuming activities in the machine shop classes. Not only did students spend several minutes setting up lathes and other machines at the beginning of the class period, they frequently set up again as they moved to other machines during the course of the class. In all of the classes, the students cleaned the shop during the last fifteen or twenty minutes of the class period. They typically brushed off the machines and swept the floors daily and cleaned a little more thoroughly on Fridays. Although clean up is considered an important part of the learning process in shop classes, it was difficult to determine from observation how much was really needed for an acceptable level of tidiness in these shops.

The MDE classes were different in structure and organization from the T & I classes. Since there was little if any equipment used, very little time was needed for setting up and cleaning up. One problem in MDE classes was that students often waited, doing nothing, in laboratory store situations. Although waiting for customers is part of a retailer's job, waiting appeared to be unproductive time for students. It was difficult, therefore, for the observers to decide whether to code the activities of students assigned to a school store as practicing technical skills or as doing nothing. In most cases, however, these students were coded as on task because they were doing what the teacher had assigned.

Three of the four MDE classes were located in comprehensive high schools. All four had handicapped mainstreamed students. All four were described by their teachers as being competency based and/or using Interstage Distributive Education Consortium (IDEC) materials, but there was little evidence that the materials were being used during the class periods observed. The MDE classes had several outside speakers, and in one class postsecondary training was promoted through a field trip to a local college.

The MDE classes had the highest concentration of female students and teachers. Three of the four teachers and 63 percent of the students were female. The percentage of the female was highest (77 percent) in the fashion merchandising class, which was located in an inner-city area vocational school and had a 100 percent percent black enrollment. The length of the MDE classes varied from 46 to 126 minutes. Distributive Education and Marketing and Distribution IV each met for only one class period per day (56 and 46 minutes), while Fashion Merchandising and Marketing and Distribution II were 126 and 111 minutes in length.

One of the two AG classes was a short 56-minute class in a comprehensive urban high school, and the other was a 122-minute class in a rural area vocational school. The teachers of both classes described the curriculum as competency based. Of the three program areas, the agriculture classes presented the greatest challenge to the observers because the shops were large and students were scattered throughout several adjoining rooms that were used as laboratories, shops, and outside.

The AG classes appeared to have reciprocal relationships with local businesses. Local equipment dealers provided equipment for students to assemble in the agricultural mechanics class in the rural area vocational school. This service provided students with the opportunity to follow instruction manuals and assemble equipment.

In several of the classes student organizations appeared to be an integral part of the curriculum. Students in the agricultural mechanics class were preparing for district Future Farmers of America (FFA) meetings and contests that called upon their included both technical skills, as well as social activities. Students in several T & I and MDE classes discussed state and regional awards for Vocational Industrial Clubs of America (VICA) and Distributive Education Clubs of America (DECA). The involvement with the youth organizations appeared to motivate and excite the students observed. The students seemed to genuinely care that they or their classmates won a regional or state competition. The students observed in the assembly in an inner-city vocational school were highly involved and pleased to hear that several students had won regional contests. One essay contest winner had written about her gratitude for the education she was receiving at that area vocational school.

Findings Related to Methods

In addition to developing the two observation instruments to support the first objective of the study, the project staff asked several questions to ascertain whether the timing of the data collection or the unit of measure used made a difference in the results. The following sections answer these questions.

Question One

What are the significant differences among the days of the week in the proportion of time students spend on task?

In answer to question one, the results of the F-test (table 7, Appendix B) indicated no significant differences between the days of the week for time on task. These results could, however, be attributed to the low number of cases since there appears to be a considerable variation among the percentages. The average percentages of time on task in all the classes for both weeks were as follows:

Monday 74.9
Tuesday 73.7
Wednesday 64.5
Thursday 63.4
Friday 69.9

While there were no statistically significant differences (0.05 level) between the days of the week, which is presented in figure 3 displays the differences in average daily time on task among the days observed.

As the line graph in figure 3 shows, the first Monday observed had the greatest proportion (82 percent) of time on task. The graph also indicates that the first Wednesday observed had the lowest (57 percent) proportion of time on task. Closer analysis through examination of the graphs for each class (figures 7 through 16, (Appendix C) shows that one class (22233) had its least amount of time on task the day when there was a substitute teaching the class. The graphs for the individual classes do show, however, that the law of averages cannot be forgotten. The patterns of time on task varied considerably from class to class, with nonroutine activities often interfering with the prevailing usage of time in each class.

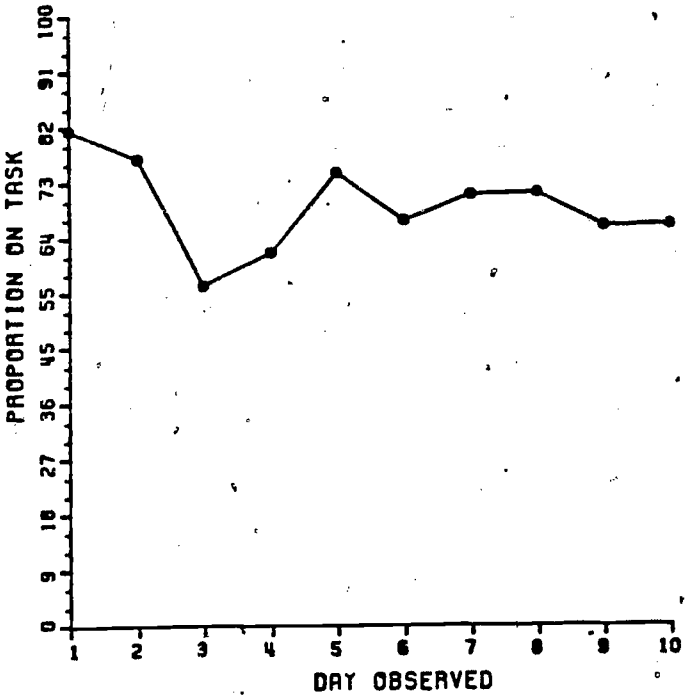

FIGURE 3. PROPORTION OF TIME ON TASK FOR THE AVERAGE OF ALL CLASSES

From the results of this study, it would be difficult to determine which particular day of the week is most conducive for direct observation of time on task. Since there was no best day across all classes, it must be concluded that several days, preferably consecutive, should be spent collecting data. Daily observation for at least a week provides an uninterrupted picture of classes allows the observer to become familiar with the class conventions and thereby record the activities more accurately.

Question Two

What is the significant difference between the first and second week of observation in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up clean-up, and on absence?

Results of the second question provided evidence that the timing of observations can make a difference. The results of t-tests shown in table 9 (Appendix B) indicated that there was a significant difference at the 0.036 level between the first and second week in the amount of time spent on technical skills. There was a higher proportion of time on technical skills during week one (46 percent) than during week two (36 percent). Additional tables, 10 through 13 (Appendix B), show that there were no statistically significant differences at the 0.05 level for total time on task (69 and 67 percent), on basic skills (5 and 7 percent), on employability skills (10 and 6 percent), on set up/clean up (7 and 7 percent) and on absence (20 and 17 percent) between the two weeks observed.

It can be concluded that the different weeks of observations yielded variations in the proportions of time on technical skills observed. It was possible that during the first week the teachers and students were more aware of being observed and concentrated more to make a good impression by working harder. It is equally likely that since the second week of observation occurred immediately after spring break in several of the classes, students concentrated less on classwork. In addition, during the second week of observations there were more nonroutine activities such as a field trip, an FFA conference, an assembly, a speaker, and so forth in the classes.

Question Three

If every 3rd or 5th minute had been recorded instead of every minute, what would the significant differences be in the proportion of time on task, on basic skills, on technical skills, on employability skills, on set up clean up, and on absence?

An F-test was used to compare the three sets (every minute, every third minute, every fifth minute) of proportions of time on each variable. In other words, the proportions found when using every minute of data were compared with the proportions found when using every third minute of data and every fifth minute of data. No significant differences were found among the three sets of proportions at the 0.05 level.

This finding can be interpreted to mean that, instead of coding every minute, every third or fifth minute of time could have been recorded and analyzed with similar results. While this interpretation may well be the case, it is important to consider that the observers continuously recorded activities as they occurred and made instantaneous decisions about activities based on preceding events in the class. If they had not been recording every minute of classtime, the observers reflected that their attention could have wandered and their focus might not have been as well attuned to the differences in activities. In addition, the observers agreed that the boredom of waiting more than a minute between times to record observations would have made the task even more difficult. Thus, while less frequent recording of data appears to be statistically feasible, the reality of the difficulties of direct observation favor the more frequent recording of observations.

Findings Related to Time

The following section presents chief findings that relate to the second objective of this study regarding time usuage. Only summary tables and figures are included with the text in order to reduce the length of this section. Additional tables and figures supporting the findings are included in the Appendices B and C.

Question One

What are the proportions of time that students in the classes spent on task (content and noncontent), off task, and on absence?

This is the key question in the study. The results are indicated in figure 4 and in table 2. Additional figures (17-26, Appendix C) display the data for each of the ten classes separately. Table 2 is comprehensive, showing the percentages of time spent in each class, as well as for the average of all classes. The pie chart (figure 4) shows the average time spent during the observations in all the classes, while the line graph in figure 5 indicates the attendance on a daily basis across the ten days of observation.

As shown in figure 4, the students spent an average of 69.15 percent of class time for time on task (A, B, C, E, and F). The students spent 55.9 percent of the class time on content, specifically basic skills (A), technical skills (B), and employability skills (C). The data in table 2 further show that 41 percent of their time was spent on technical skills, primarily practice or hands-on (27 percent). Students spent 7 percent of the class time setting up or cleaning up (E in figure 4), although that proportion varied greatly among different types of

classes. In the machine shop classes, for example, students spent from 7 to 24 percent of the time setting up and cleaning up while in the marketing and distributive education classes they spent very little time, (0 to .9 percent) on those activities.

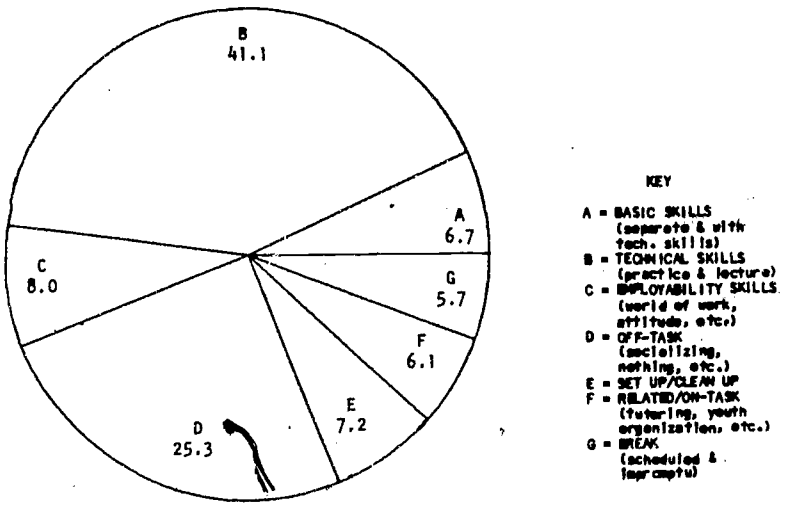

FIGURE 4. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN ALL CLASSES DURING TWO WEEKS OF OBSERVATION

Students used 6 percent of their time for related activities that were on task but not specific to content, such as youth organization activities. Vocational educators have strongly felt that these activities are important for the development of student leadership, self-esteem, and motivation to work in a related occupational area.

Time off task (31 percent) included breaks (6 percent) and doing nothing, waiting, or socializing (25 percent). The breaks were either scheduled and mandatory or informally announced at the teacher's discretion.

The proportion of time spent in each individual class is indicated in figures 18 through 22, while figures 8 through 17 (Appendix C) show the pattern of time usage in each class. There appeared to be a common pattern to the periods of time off task in each class. Typically students waited or socialized at the beginning of the class time until the teacher started them on

TABLE 2

DISTRIBUTION OF TIME SPENT BY STUDENTS IN VOCATIONAL EDUCATION CLASSES OBSERVED IN THE STUDY

Student Activities		ALL TEN CLASSES IN STUDY			RURAL: Agricultural Mechanics (11115)			RURAL: Machine Trades (11323)		
		Week 1	Week 2	Ave.	Week 1	Week 2	Ave.	Week 1	Week 2	Ave.
Basic Skills w/Tech. Skills	R[2]	1.[illegible]	4.6	3.0	.2	8.9	4.6	3.4	3.8	3.6
	C[3]	0.8	.9	1.8	0	0	0	.5	1.9	1.2
	W[4]	2.3	.9	1.6	0	6.2	3.1	0	1.2	.6
Basic Skills Alone	R[2]	.1	0	.1	0	0	0	0	.1	0
	C[3]	0	0	0	0	0	0	0	0	0
	W[4]	.1	.1	.1	0	.1	0	0	0	0
Technical Skills	T[5]	14.1	10.5	12.3	21.6	11.2	16.4	5.2	.9	3.0
	P[6]	32.0	25.7	28.8	46.1	22.3	34.2	58.3	24.2	41.5
Job SMA		6.3	3.6	4.8	.2	0	.1	0	0	0
Knowl./World/Work		2.8	2.0	2.4	.7	.8	.7	0	.4	.2
Work Att. & Values		1.2	.4	.8	.4	3.2	1.8	.3	0	.1
Listen		1.9	6.3	4.2	1.7	22.4	12.0	.7	8.5	4.5
Set up		3.9	4.2	4.0	4.7	4.0	4.3	8.2	17.8	13.0
Clean up		3.5	2.7	3.1	3.2	1.0	2.1	6.4	6.2	6.3
Out/Rel[7]		.8	1.9	1.4	.9	4.7	2.8	3.0	4.9	3.9
Out/Nonrel[8]		3.8	2.4	3.1	6.8	3.2	5.0	1.7	2.2	1.9
Conf W/Teacher		.3	.5	.4	.4	.3	.3	1.1	.9	1.0
Wait/Nothing		9.4	9.9	9.6	6.5	4.6	5.5	5.3	11.7	8.5
Socialize		14.1	17.2	15.6	6.9	7.6	7.2	6.3	14.4	10.3
Be Disciplined		0	0	0	0	0	0	0	.2	.1
Break		1.4	3.6	2.6	0	0	0	0	1.3	.6
On Task		69.3	66.9	68.1	80.1	85.1	82.4	87.1	70.8	[illegible]
Off Task		30.7	33.3	32.1	20.2	15.4	17.7	13.3	29.8	[illegible]
Total Time[1]		99.1	99.4	99.7	100.3	100.5	100.1	100.4	100.6	[illegible]
Content[9]		59.5	51.3	55.3	69.2	52.7	60.8	67.7	32.5	[illegible]
Absent[10]		20.2	16.6	18.4	11.0	8.5	9.7	13.4	15.9	[illegible]

1 Totals do not equal 100 percent due to rounding
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3 Calculation
4 Writing
5 Theory
6 Practice
7 Out of room - related activity, such as tutoring
8 Out of room - nonrelated activity, such as restroom visit
9 Content includes basic skills with technical skills; basic skills alone; technical skills theory and practice; job seeking, maintaining, and advancing; knowledge of the world of work; and work attitudes and values.
10 Absent includes time students are late for class

TABLE 2

(Continued)

Student Activities	ALL TEN CLASSES			URBAN								
				Agriculture (22145)			Distributive Ed (22233)			Machine Trades (23524)		
	Week 1	Week 2	Ave.	Week 1	Week 2	Ave.	Week 1	Week 2	Ave.	Week 1	Week 2	Ave.
Basic Skills w/Tech. Skill R[2]	1.5	4.6	3.0	2.0	4.7	3.3	2.3	9.1	5.7	0	.5	.2
C[3]	0.8	.9	1.8	0	0	0	0	0	0	0	5.9	3.0
W[4]	2.3	.9	1.6	8.0	0	4.0	0	0	0	0	0	0
Basic Skills Alone R[2]	.1	0	.1	0	0	0	0	0	0	0	0	0
C[3]	0	0	0	.3	0	.1	0	0	0	0	0	0
W[4]	.1	.1	.1	0	0	0	0	0	0	0	0	0
Technical Skills T[5]	14.1	10.5	12.3	40.4	22.5	31.4	24.3	10.6	17.4	17.4	8.0	12.7
P[6]	32.0	25.7	28.8	27.2	7.3	17.2	14.9	19.1	17.0	49.9	49.5	49.7
Job SMA	6.3	3.6	4.8	0	2.6	1.3	0	11.6	5.8	0	0	0
Knowl/World/Work	2.8	2.0	2.4	0	1.9	.9	4.8	0	2.4	0	0	0
Work Attitudes	1.2	.4	.8	0	0	0	0	0	0	0	0	0
Listen	1.9	6.3	4.2	4.9	17.5	11.2	2.8	.2	1.5	0	0	0
Set up	3.9	4.2	4.0	0	.4	.2	.1	.9	.5	3.9	2.5	3.2
Clean up	3.5	2.7	3.1	.3	7.6	3.9	.6	0	.3	3.8	3.7	3.7
Out/Rel[7]	.8	1.9	1.4	0	0	0	.1	.2	.1	1.4	.1	.7
Out/Nonrel[8]	3.8	2.4	3.1	2.5	2.4	2.4	3.8	5.1	4.5	3.8	2.5	3.2
Conf W/Teacher	.3	.5	.4	0	.1	0	.1	.5	.3	.5	1.7	1.1
Wait/Nothing	9.4	9.9	9.6	6.9	15.6	11.2	6.3	12.6	9.4	1.0	2.1	1.5
Socialize	14.1	17.2	15.6	7.3	17.8	12.5	40.0	30.1	35.0	16.8	15.2	16.0
Be Disciplined	0	0	0	0	0	0	0	0	0	0	0	0
Break	1.4	3.6	2.6	0	0	0	0	0	0	1.5	8.3	4.8
On Task	69.3	66.9	68.1	83.1	64.6	73.5	50.0	52.2	51.0	76.9	71.9	74.3
Off Task	30.7	33.3	32.1	16.7	35.8	26.1	50.1	47.8	48.9	23.1	28.1	25.5
Total Time[1]	99.1	99.4	99.7	99.8	100.4	99.6	100.2	100.0	99.9	100.0	100.0	99.8
Content[9]	59.5	51.3	55.3	77.9	39.0	59.2	46.3	50.4	48.3	67.3	63.9	65.6
Absent[10]	20.2	16.6	18.4	26.2	19.6	22.9	20.1	14.2	17.1	20.8	27.4	24.1

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9 Content includes basic skills with technical skills; basic skills alone; technical skills theory and practice; job seeking, maintaining, and advancing; knowledge of the world of work; and work attitudes and values.
10 Absent includes time students are late for class

TABLE 2

(Continued)

Student Activities		ALL TEN CLASSES Week 1	ALL TEN CLASSES Week 2	ALL TEN CLASSES Ave.	INNER CITY Fashion Merchandising (34265) Week 1	INNER CITY Fashion Merchandising (34265) Week 2	INNER CITY Fashion Merchandising (34265) Ave.	INNER CITY Machine Trades (35353) Week 1	INNER CITY Machine Trades (35353) Week 2.	INNER CITY Machine Trades (35353) Ave.
Basic Skills w/Tech. Skills	R[2]	1.5	4.6	3.0	1.7	.4	1.1	0	1.3	.6
	C[3]	0.8	.9	1.8	2.2	.3	1.2	1.2	15.8	8.5
	W[4]	2.3	.9	1.6	14.8	1.1	7.9	0	.1	.1
Basic Skills Alone	R[2]	.1	0	.1	.8	.1	.4	0	0	0
	C[3]	0	0	0	0	0	0	0	0	0
	W[4]	.1	.1	.1	0	.4	.2	0	0	0
Technical Skills	T[5]	14.1	10.5	12.3	11.4	19.3	15.3	4.0	.9	2.5
	P[6]	32.0	25.7	28.8	31.1	24.3	27.8	52.4	37.7	45.0
Job SMA		6.3	3.6	4.8	.5	2.4	1.5	2.1	1.7	1.9
Knowledge/World/Work		2.8	2.0	2.4	.6	4.4	2.5	0	0	0
Work Attitude		1.2	.4	.8	6.5	.9	3.7	0	0	0
Listen		1.9	6.3	4.2	1.1	14.7	7.9	0	4.2	2.1
Set up		3.9	4.2	4.0	1.5	.3	.9	17.6	17.3	17.5
Clean up		3.5	2.7	3.1	1.2	.2	.7	7.2	5.8	6.5
Out/Rel[7]		.8	1.9	1.4	.1	4.0	2.1	.2	.8	.5
Out/Nonrel[8]		3.8	2.4	3.1	.7	2.2	1.5	.5	.2	.3
Conf W/Teacher		.3	.5	.4	.1	0	0	.5	2.1	1.3
Wait/Nothing		9.4	9.9	9.6	16.0	11.6	13.8	6.2	3.6	5.0
Socialize		14.1	17.2	15.6	4.8	11.6	8.1	1.3	4.2	2.7
Be Disciplined		0	0	0	0	0	0	.2	.3	.2
Break		1.4	3.6	2.6	4.9	1.5	3.2	6.9	4.0	5.5
On Task		69.3	66.9	68.1	73.6	72.8	73.2	85.2	87.6	86.4
Off Task		30.7	33.3	32.1	26.4	26.9	26.6	15.1	12.3	13.7
Total Time[1]		99.1	99.4	99.7	100.0	99.7	99.8	100.3	99.9	100.1
Content[9]		59.5	51.3	55.3	69.6	53.2	61.6	59.7	57.4	58.5
Absent[10]		20.2	16.6	18.4	32.6	15.0	23.8	4.5	23.8	15.2

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4 Writing
5 Theory
6 Practice
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8 Out of room - nonrelated activity, such as restroom visit
9 Content includes basic skills with technical skills; basic skills alone; technical skills theory and practice; job seeking, maintaining, and advancing; knowledge of the world of work; and work attitudes and values.
10 Absent includes time students are late for class

-TABLE 2

(Continued)

Student Activities		ALL TEN CLASSES Week 1	ALL TEN CLASSES Week 2	ALL TEN CLASSES Ave.	SUBURBAN Mktg. & Distribution II (46273) Week 1	Week 2	Ave	Mktg. & Distribution IV (46282) Week 1	Week 2	Ave	Auto Body (47393) Week 1	Week 2	Ave.
Basic Skills w/Tech. Skill	R[2]	1.5	4.6	3.0	3.7	0	1.8	.8	17.9	9.3	1.0	0	0
	C[3]	0.8	.9	1.8	0	0	0	0	4.8	2.4	4.5	.3	2.4
	W[4]	2.3	.9	1.6	.6	0	.3	0	0	0	0	0	0
Basic Skills Alone	R[2]	.1	0	.1	.2	0	.1	0	0	0	0	0	0
	C[3]	0	0	0	0	0	0	.4	0	.2	0	0	0
	W[4]	.1	.1	.1	.1	0	0	0	0	0	.3	0	.1
Technical Skills	T[5]	14.1	10.5	12.3	7.1	14.5	10.8	3.9	16.3	10.1	6.2	1.5	3.8
	P[6]	32.0	25.7	28.8	0	22.0	11.0	0	.3	.1	41.0	50.6	45.8
Job SMA		6.3	3.6	4.8	26.1	3.8	14.9	34.4	13.7	23.8	0	0	0
Knowl/World/Work		2.8	2.0	2.4	5.9	5.6	5.8	15.4	7.0	11.2	.7	.8	.7
Work Attitudes		1.2	.4	.8	1.0	0	.5	0	0	0	.1	0	0
Listen		1.9	6.3	4.2	6.3	.5	3.4	.4	1.2	.8	.8	.2	.5
Set up		3.9	4.2	4.0	0	.2	.1	0	0	0	4.6	4.5	4.5
Clean up		3.5	2.7	3.1	0	.2	.1	0	.3	.1	3.8	4.5	4.1
Out/Rel[7]		.8	1.9	1.4	1.7	2.1	1.9	0	.3	.1	0	.1	0
Out/Nonrel[8]		3.8	2.4	3.1	10.9	3.8	7.3	15.7	.5	8.1	.6	1.3	.9
Conf W/Teacher		.3	.5	.4	0	.1	0	0	.1	.1	.1	0	0
Wait/Nothing		9.4	9.9	9.6	8.4	7.4	7.9	6.5	5.9	6.2	30.5	24.2	27.3
Socialize		14.1	17.2	15.6	26.6	31.9	29.2	24.4	32.7	28.6	6.3	7.0	6.6
Be Disciplined		0	0	0	0	0	0	0	0	0	0	0	0
Break		1.4	3.6	2.6	1.2	7.8	4.7	0	0	0	.7	5.1	2.9
On Task		69.3	66.9	68.1	52.7	49.0	50.7	55.3	61.9	58.2	63.0	62.5	61.9
Off Task		30.7	33.3	32.1	47.1	50.9	49.1	46.6	39.1	42.9	38.1	37.6	37.7
Total Time[1]		99.1	99.4	99.7	99.8	99.9	99.8	101.9	101.0	101.1	101.1	100.1	99.6
Content[9]		59.5	51.3	55.3	44.7	45.9	45.2	54.9	60.9	57.1	53.8	53.2	52.8
Absent[10]		20.2	16.6	18.4	24.9	16.9	20.9	39.5	13.1	26.3	14.2	13.5	13.9

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10 Absent includes time students are late for class

individual activities or lectured. At the beginning of shop classes the students set up their equipment and projects for several minutes. The students then worked intensely for awhile until there was a formal or an informal break or a change in the type of activity. The T & I and AG classes often started with a lecture and then changed to practice in the shop area of the classroom. After the break or change, the students again worked fairly intensely until the time to start cleaning up. There were variations, of course, within classes because of interruptions or nonroutine activities such as the FFA conference. Variations also existed among classes, especially between the MDE classes and the T & I classes.

The teachers appeared to be the key determinant in the amount of time students spent on task or off task. While students may have known what they were supposed to do on their own, a few invariably required individual teacher attention to set up, organize for working with the equipment, or open their books. Nevertheless, in some instances the students supervised their own time on task. In all of the shop classes the students spent most of their time on individually paced projects (described by teachers as competency based). Small groups of students often worked together to assemble a piece of machinery or solve a problem, as in the fashion merchandising class. Sometimes students served as a shop foreman or toolroom supervisor for a day and did not work on individual or small group projects. A few students in the MDE classes were assigned to the class laboratory store or boutique to serve as salespersons who waited on customers, stocked the shelves, and counted merchandise for inventory purposes.

Attendance is illustrated with line graphs, with the average for all classes across the ten days of observation shown in figure 5 and the averages for the individual classes in figures 27 through 36 (Appendix C). As indicated in figure 5, the average attendance was slightly higher during the second week than during the first week of observations. The data in table 2 show that absence was over 20 percent during the first week compared to about 17 percent the second week. The lowest average percentage of absence, computed from the totals shown in table 2, was at the rural site (12 percent) with the highest at the inner city (19.5 percent), the suburban (20.5 percent), and urban (21 percent) sites. The time spent in school is, of course, a significant determinant of the amount of time available for student to learn. It appears that, on the average, the students observed were absent from their vocational education classes approximately 18 percent of the time scheduled.

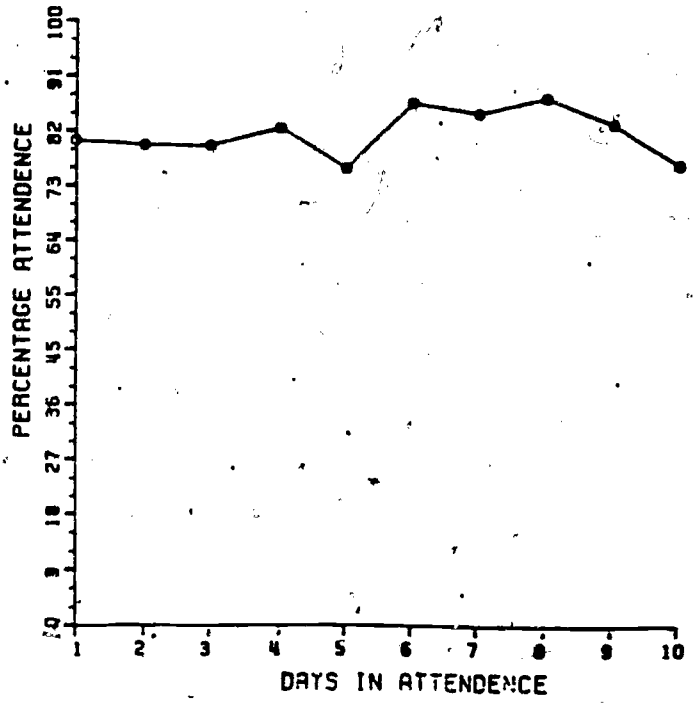

FIGURE 5. AVERAGE PERCENTAGE OF ATTENDANCE FOR ALL CLASSES DURING TWO WEEKS OF OBSERVATION

Across all the variables discussed in the first question 1 there is considerable variation among the vocational education classes observed in this study. It is tempting to conclude from the average of all the classes that vocational education students spend 69 percent of class time on task and 31 percent off task. It is prudent to remember, however, that these classes represent three program areas and were not selected at random. It is also important to emphasize that the tables and figures for the individual classes portray striking differences that must be acknowledged when making comparisons or judgments. For example, the average time on tsk in one MDE class (22233) was 51.0 percent in contrast to 86.4 percent in a T & I class (35353).

Question Two

What are the proportions of time that the three selected students in each class spent on task (content and noncontent), off task, and on absence?

The second question provided information about the time spent each minute by thirty students from the ten classes. The data in table 3 show that the thirty students' total time on task in ten classes through ten class periods ranged between 35 and 88 percent. There was a wider range of time on task/content among students in different classes than among students in the same class. The time on task/noncontent varied considerably from virtually no time (0.0, 0.0, 0.5 percent) spent on activities such as set up/clean up in a distributive education class (22233) to about a fourth of the time (28.2, 21.5, 26.5 percent) spent on those activities in a machine shop class (35353). There is, of course, little need to set up or clean up in most MDE classes, but the time spent on those activities in that machine shop (35353) appears excessive compared to the time spent in the other machine shops (5.6 - 11.1 percent).

The students' time off task ranged from 12.2 percent for one student in Machine Shop (35353) to 61.3 percent for a student in Distributive Education (22233). There seems to be an inverse relationship between the time spent on task/noncontent and time off task for the students in these two classes (35353 and 22233). Perhaps the small size number of students--only seven in the Machine Shop class (35353) was easier to keep on task, or perhaps the students had learned to appear busier than they really were by manipulating machinery and tools instead of merely waiting or socializing between time spent working.

Absences varied among the students, with a range of no minutes tardy (0.0 percent) to a combined time of absence and minutes tardy of 33.4 percent of their total possible time in class. The absence rate should be kept in mind, as cautioned previously, when considering how much time students really spent learning in their classes.

Question Three

What is the significant difference between the mean of the three students in each class and the mean of all the students in the class in the proportion of time on task (content and noncontent), off task, and on absence?

The third question provided comparisons of the three students to their own classes. One machine shop class (35353) was dropped from this analysis because its low enrollment of seven students would have skewed the results. For each variable, the mean of the three individual students' proportions of time was compared to the class mean with a t-test. The results, as displayed in tables 15 through 21 (Appendix B), showed no significant differences (0.05) for either on task (content and noncontent) or off task for any of the comparisons. The means for th...

TABLE 3

PROPORTIONS OF TIME [1] SPENT BY
THREE INDIVIDUAL STUDENTS IN TEN VOCATIONAL EDUCATION CLASSES

Class	Student	Time on Task			Time Off Task	Absence(2)
		Total	Content	Non-Content		
Agriculture Mechanics (11115)	1	73.5	65.5	8.0	26.5	0
	2	67.3	66.5	.8	32.7	10.0
	3	68.4	67.1	1.3	31.6	0.1
Agriculture (22143)	1	76.1	75.2	.9	23.9	0
	2	73.1	72.2	.8	27.0	0
	3	69.4	68.3	1.1	30.5	20.2
Distributive Education (22233)	1	52.2	52.2	0.0	47.9	0
	2	48.7	48.7	0.0	51.3	0
	3	38.2	38.2	.5	61.3	0
Fashion Merchandising (34263)	1	86.0	79.5	6.5	14.0	0
	2	82.3	79.8	2.5	17.4	20.3
	3	78.7	75.8	2.9	21.3	2.4
Market & Distributive Education II (46273)	1	34.5	33.4	.3	56.3	10.1
	2	51.9	51.8	.3	47.8	.3
	3	48.7	48.6	.2	51.1	20.1
Market & Distrib. Ed. IV (46282)	1	61.4	61.0	1.7	37.3	12.4
	2	52.9	52.9	.0	47.1	3.0
	3	59.3	59.1	.4	40.5	20.0
Machine Trades (11323)	1	73.5	65.5	8.0	26.5	10.1
	2	77.4	66.4	11.1	22.5	0.1
	3	74.7	68.1	7.6	24.3	10.7
Machine Shop (23324)	1	62.3	56.2	6.1	37.7	30.0
	2	75.9	67.9	8.0	24.1	.1
	3	73.3	67.9	5.6	26.5	10.1
Machine Shop (35353)	1	87.7	59.6	28.2	12.2	11.1
	2	77.8	56.3	21.5	22.2	33.4
	3	86.3	59.9	26.5	13.6	0
Auto Body (47393)	1	71.1	70.2	.9	28.9	.1
	2	71.7	71.1	.7	28.2	.2
	3	49.9	49.1	.1	50.0	20.1

NOTE: 1 Mean percents for both weeks observed
2 Absence includes minutes late for class

individual students were higher for technical skills and time off task, while they were lower for set up/clean up than the means for their classes.

There were significant differences well beyond the 0.01 level, between the means of the individual students and their class means with respect to absence. The means of the individual students were considerably lower (0.48) than the means for their classes (19.26).

The results indicate that the means of the three students were representative of their classes in the proportions of time spent in their classes upon various on-task and off-task activities. They were obviously not representative in absence. Perhaps the observers inadvertently selected students who were more motivated to attend class than their classmates. From this analysis it could be inferred that a relatively small number of students (3) can be used to determine the time on or off task of a class, but not necessarily their average rate of absence.

Question Four

What are the proportions of time spent by the teachers on content and on noncontent?

The results of the fourth question indicated the amount of time teachers spent on curricular content in their classes. As shown in table 4, teachers allocated, on the average, 67.0 percent of their class time for time on content. They spent the remaining 32.7 percent of the time on noncontent activities, including tasks such as taking roll.

There was a range of 42 to 76 percent time on content among all the teachers. The T & I teachers spent the highest proportion of time on content (72 percent) while the MDE teachers spent the lowest (57 percent). The teachers used the bulk of the time for technical skills, with the T & I teachers using an average of 57 percent of the time for practice of technical skills and another 10 percent for related theory. While the two AG teachers spent similar amounts of time (50 and 48 percents) on technical skills, the teacher of Agricultural Mechanics (11115) spent 42 percent on practice compared to 10 percent by the teacher in Vocational Agriculture (22143). The MDE teachers used the least amount of time for technical skills, with 19 percent for related theory and 18 percent for practice. On the other hand, the MDE teachers spend far more time (18 percent) than the other teachers (1 percent) for employability skills. On the whole, the teachers spend very little time (4 percent) on basic skills, with the exception of the teacher in Vocational Agriculture (22143) who had a much higher percentage (16 percent).

TABLE 4

PERCENT OF TIME SPENT ON TYPES OF CONTENT
BY TEACHERS IN VOCATIONAL EDUCATION CLASSES

PROGRAM AREA Class (study code)	Basic Skills w/Tech Skills	Tech Skills/ Theory	Tech Skills/ Practice	Job Seeking, Maintaining Advancing	Knowledge World of Work	Work Attitudes & Values	Total on Content	Other/ Management/ Transition	Note:
Agricultural Ed.									
Agr. Mechanics (11115)	6.3	18.4	42.4	.1	.8	.6	69.3	30.7	Substitute 2 days
Vocational Agr. (22143)	16.4	38.6	9.5	0	0	0	64.5	35.5	Substitute 1 day
Mean	11.35	28.5	29.95	.5	.4	.3	66.9	33.1	
Distrtibutive Ed.									
Dist. Ed. (22233)	0	29.5	29.5	11.8	0	0	71.4	28.6	
Fash. Merch. (34263)	1.7	28.1	31.4	1.0	2.6	4.0	71.3	28.7	
Mktg. & Dist. II (46273)	0	11.1	8.1	16.5	6.4	0	42.1	57.9	Substitute 2 days
Mktg. & Dist. IV (46282)	.7	9.1	2.2	21.3	10.2	0	43.7	56.3	Substitute 1 day
Mean	.6	19.45	17.8	12.65	4.8	1.0	57.12	42.88	
Trade & Industrial									
Autobody (47391)	2.5	4.4	68.8	0	.3	0	76.3	23.7	
Mach. Trades (11323)	2.2	5.3	54.2	.1	.4	.2	62.6	37.4	Substitute 2 days
Mach. Shop (23324)	5.7	27.4	39.2	0	0	0	72.3	27.7	
Mach. Shop (35353)	7.7	3.1	64.5	0	0	0	76.2	23.8	
Mean	4.53	10.05	56.68	.25	.18	.05	71.85	28.15	
Mean for all teachers	4.1	15.9	41.4	3.2	1.5	.5	67.0	32.7	99.7[1]

NOTE: Percents for teachers include ten classes observed in the study; ninety-nine classes observed in total.
[1]Total does not equal 100 percent due to rounding.

The data from table 4 show that the teachers' average time on curricular content was 67 percent, while, as shown in figure 4 previously, the students' average time on content was 56 percent. This disparity between teacher and student time on content is consistent with other findings (Stallings and Kaskowitz 1974; Fisher et al. 1978) indicating that students typically are not on task all of the time that is allocated for subject matter. Regardless of how much teachers attempt to keep every student motivated and at task with specified content, some students socialize, or do other things. The findings from this study suggest either that some teachers may have used better strategies to keep students on task than other teachers or that the particular curricular content of a class is more conducive to time on task.

Question Five

What are the proportions of time spent by teachers on various pedagogical methods and other activities?

The fifth question yielded information about the various ways teachers manage and teach their classes. As shown in table 5, teachers spent well over a fourth (29 percent) of their time providing one-to-one instruction. Table 5 displays the teachers' primary pedagogical methods or activities while table 14 (Appendix B) shows the second method/activity they employed simultaneously. For example, the second method/activity was recorded to portray accurately those instances when the teacher lectured and showed slides at the same time. As the data in table 14 (Appendix B) indicate, during 61 percent of the time the teachers used no secondary method/activity.

The teachers worked at their desks or stations in the class or shop almost 12 percent of the time. They observed students working at their stations, either by standing or walking around, almost 9 percent of the time as a primary method/activity and 7 percent as a secondary activity. The teachers gave directions or provided instructions similar amounts of time (almost 9 percent primary, 7 percent secondary). Although lecture and discussion were the chief instructional methods in secondary academic subject classes (Stallings and Mohlman 1981), in this study teachers lectured 8 percent and led discussions about 3 percent of the time, while they provided one-to-one instruction 29 percent of the class time.

A relatively high percentage of time was recorded for talking to the observers from this study, although the data were heavily skewed because of one teacher's (15 percent) persistence in talking to one or another of the observers. The other nine teachers spent between 0 to 5 percent of their class time talking to the observers.

Table 5

PERCENT OF TIME SPENT ON PRIMARY INSTRUCTIONAL METHODS/ACTIVITIES BY TEACHERS IN VOCATIONAL EDUCATION CLASSES

PROGRAM AREA CLASS (Study Code)	Individual Instruction	Work at Desk	Observe Students	Give Directions or Instruction	Lecture	Talk to Observer	Out of Classroom	Talk to other staff/ nonclass students	Lead discussions
Agricultural Ed									
Agr. Mechanics (11115)	24.3	2.5	12.7	7.6	5.8	0.7	3.0	.9	4.9
Vocational Agr. (22143)	.5	5.5	11.3	15.7	33.4	3.2	.2	3.2	3.0
Mean	24.4	4.0	12.0	11.65	19.6	1.95	1.6	2.05	3.95
Distributive Ed.									
Dist. Ed. (22233)	14.3	8.6	4.3	18.9	23.8	1.4	0	2.2	.9
Fash. Merch. (34263)	19.3	4.3	11.3	8.7	6.0	0	.9	2.1	14.3
Mktg. & Dist. II (46273)	1.4	36.2	5.3	3.0	23.8	1.4	7.7	.6	0
Mktg. & Dist. IV (46282)	0	42.8	1.3	0	26.1	1.3	9.3	2.4	0
Mean	8.75	22.98	5.55	7.65	19.93	1.03	4.48	1.83	3.8
Trade & Industrial									
Autobody (47391)	46.5	.7	4.2	8.6	3.9	14.8	2.7	3.5	.2
Mach. Trades (11323)	37.2	14.0	19.1	6.5	.3	1.4	2.0	2.9	1.8
Mach. Shop (23324)	29.5	20.6	5.7	15.7	0	4.2	5.3	6.1	.2
Mach. Shop (35353)	63.5	1.3	9.9	2.8	1.2	.5	1.4	2.4	.2
Mean	44.18	9.15	9.73	8.4	1.35	5.23	2.85	3.73	.6
Mean for all teachers	29.1	11.8	8.8	8.8	8.3	3.7	3.2	2.8	2.6

NOTE: Primary instructional methods/activities were observed to be the chief mode used by teachers; during 39 percent of the time a secondary mode was occurring concurrently. Percentage for teachers include ten classs observed in the study; ninety-nine classes observed in total. Additional methods/activities upon which teachers spent low proportions of time in classes:

none indicated	1.0	write on board	.5
pass out materials	.6	check out tools	.5
grade papers	.6	discipline	.3
repair equipment	.6	pass out-collect papers	.2
miscellaneous	.6	get materials	.1

Surprisingly, the teachers did not spend much time (2 percent primary, 6 percent secondary) in demonstrating techniques, especially to the entire class. During informal discussions after the classes, the teachers explained that most of their lectures and demonstrations about new skills had been done during the earlier months of the school year. All the T & I teachers helped clean up the shops (1 percent of the time), while none of the teachers in the other program areas did so.

Many time-on-task studies point to discipline as one of the teacher's chief activities (Stallings and Mohlman, 1981). In this study, teachers spent very few minutes (.3 percent) disciplining the students. Teachers reprimanded students or asked them to stop talking occasionally, but even with substitute teachers the majority of the students did not receive much attention for disciplinary reasons. The observers noted that there were a few occasions when the teachers overlooked or deliberately ignored behaviors such as playing cards or throwing paper wads. For most of the time observed, however, the students were occupied in relatively active tasks that appeared to hold their interest or they were socializing in a very low-key fashion that did not detract from other students' learning. In contrast, the teachers of most academic subject classes usually do not tolerate even low-key student interaction. Therefore, disciplinary action or reprimands from these teachers are common occurances in their classroom. This could account for the disparity between time spent on discipline in academic and vocational education classes.

Question Six

What are the significant differences among short, medium, and long classes in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

Previously table 2 shows the length of each class in minutes. The short classes (46 to 56 minutes) were Vocational Agriculture (22143), Distributive Education (22233), and Marketing and Distribution IV (46282). All of the short classes were located at comprehensive high schools. The medium classes (111-126 minutes) were Agricultural Mechanics (11115), Fashion Merchandising (34263), and Marketing and Distribution II (46273). The first two of these medium length classes were at area vocational schools while the latter was at a comprehensive high school. The long classes (146-176 minutes), located at area vocational schools and all T & I courses were Autobody (47391), Machine Trades (11323), Machine Shop (23324) and Machine Shop (35353).

The results of F-tests, shown in tables 22 through 28 (Appendix B), indicated significant differences among the

different length classes at well beyond the 0.01 level in time on technical skills and time on set up/clean up. The results also indicated significant differences (0.05 level) in total time on task and time on employability skills. But they did not indicate significant differences for time on basic skills or absence among classes of different lengths.

Further analyses were conducted to discern which classes--short, medium, or long--were most different from each other in the variables that showed a significant difference. The results of the Student-Newman-Keuls procedure are displayed in tables 29 through 33 (Appendix B). These tables graphically indicate that the greatest differences were to be found between short and long classes, with medium classes either more similar to one or the other depending on which variable was considered. The long classes had the highest means, or greatest proportion of time for all of the on task variables (time on task, technical skills, employability skills and set up/clean up).

Therefore, it can readily be concluded of analyses that students in long classes (146-176 minutes) had significantly higher proportions of time on task, especially in technical skills and set up/clean up than students in short classes (46-56 minutes). In this study all the T & I classes at area vocational schools were long ones. The means of medium length classes (111-126 minutes) were closer to those of short classes for technical skills and closer to those of long classes for total time on task. Apparently, class length made a significant difference in the amount of time spent on task in vocational education classes, with more class time resulting in higher proportions of time on content-related activities.

Question Seven

What are the significant differences among the program areas (AG, MDE and T & I) in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

The program areas (AG, MDE or T & I) of each class are listed in table 2. The proportions of time spent in the two AG, four MDE and four T & I classes were analyzed with F-tests (tables 34 through 40, Appendix B), which indicated significant differences (0.05 level) for time on task and for time on set up/clean up. There were also significant differences (.05 level) for time on absence with no significant differences for the other variables tested.

The Student-Newman-Keuls procedure was used to discern homogeneous subsets for the variables that indicated significant differences among the program areas. As the data in tables 41 through 43 (Appendix B) indicate, the MDE classes had the lowest proportion of time on task while the T & I and AG classes had the highest. The MDE and T & I classes differed most from each other in the amount of time spent for set up/clean up while the AG classes were statistically between both of the other types of classes. The AG classes showed a low mean for absence (10 percent), while the T & I and MDE classes showed significantly different higher means (19 and 21 percents).

While the program areas are not represented with equal numbers of classes or students in this study, it appears that there is a trend for higher proportions of time on task in the classes that have more opportunities for hands-on practice of skills and where other than content specific activities such as set up or clean up add to the total amount of time on task. There seemed to be no readily discernable reason, however, for the discrepancy in absence between the AG and the T & I/MDE programs from the evidence analyzed in this study.

Question Eight

What are the significant differences among the three machine shops in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, off task, and on absence?

For the answer to the question, three classes in the same program area and with similar curricula were compared. As presented in tables 44 through 50 (Appendix B), F-tests were again used to analyze the variance among the three machine shops for significant differences (0.05 level) among several variables. No significant differences were found for absence, time on basic skills, or time on employability skills. But a significant difference (well beyond the 0.01 level) did emerge for set up/clean up, as well as significant differences for total time on task and time on technical skills.

The Student-Newman-Keuls Procedure analyses indicated (tables 51 through 54, Appendix B) that the greatest difference for time on task was between the urban machine shop (23324) and the inner-city machine shop (35353), with the latter having the higher mean. Similarly, those two machine shops had the largest discrepancy (7 percent urban, 24 percent inner city) for set up/clean up. The greatest discrepancy for time off task was found

between the inner-city (35353) and the rural machine shop (11323). The latter had the greatest proportion of time off task among the three classes. Although this statistical procedure did not find significant (0.05 level) discrimination among the three classes in terms of homogeneous subsets for technical skills, the means of the rural machine shop (11323) and urban machine shop (23324) appeared much lower (44 and 47 percent) than the mean for the inner city machine shop (62 percent).

One conclusion that can be drawn from the foregoing analysis is that, despite the similarities in program (T & I), class name (machine shop), curriculum, of stated purpose, these factors appear to include the number of students in the class and the length of the class, most importantly perhaps, as classes probably differ (statistically) significantly in time on various activities because of many factors beyond similarity in program, class name, curriculum, or stated purpose. As shown in the results of a previous question, the time allocated by the teacher determines the upper limit of time possible for students' time on task/content.

Question Nine

What are the significant differences between classes taught by substitute teachers and those taught by the regular teacher in terms of time on task?

Nine of the ninety-nine class periods observed in this study were taught by substitute teachers. The proportions of time on task for the five classes that had a substitute teacher during the ten days of observation were analyzed with a t-test to compare for significant differences in the means between days with and without a substitute teacher. According to the data in table 55 (Appendix B) a significant difference at the 0.046 level, emerged, indicating that classes with the regular teacher had a higher proportion of time on task than those taught by the substitutes.

Observers noted that, although the substitute teachers were task oriented and tried to motivate the students to work on their projects in the shop classes, the students appeared to socialize more and avoided long periods of involvement with their work. None of the substitutes appeared to "baby sit," and most seemed to be familiar with the class routines because they had substituted in the school and in the class previously. In the agricul tural mechanics class (11115), the substitute was a former school farm manager who served as a permanent substitute in the system since the school farm had been sold. In one MDE class, the substitute was a former teacher, now a restaurant owner who appeared to capture the students' interest with his explanations of how marketing and sales are conducted in the "real world" of business.

Nonetheless, despite the efforts of the substitutes, it must be concluded that students were on task more often when their regular teachers were present. Perhaps one of the primary motivating factors for students' on task learning behaviors is whether they are being evaluated for their efforts. If being graded is a factor, then the substitute teacher surely would not have the same influence as the regular teacher. On the other hand, a case could also be made that the regular teacher manages the students better through different instructional methods than those used by the substitute teachers. The question of the instructional methods' effect on time on task remains to be answered in further study in vocational education classes.

Question Ten

What are the significant differences between classes with fewer or more students in the proportion of time on task?

This question sought to ascertain whether class size appears to affect time on task in vocational education classes. It is important to obtain this information since a previous question confirmed that vocational education teachers provide a great deal of one-to-one instruction. Obviously, the larger the class, the less time is available for instructing individual students.

Since there was only one small class with seven students (machine shop 35353), it was dropped from this analysis. A t-test was conducted between the remaining five medium classes (15 - 17 students) and the four large classes (24 - 26 students). Table 56 (Appendix B), indicates that medium classes, with a 74 percent mean, had a significantly higher (well beyond the 0.01 level) proportion of time on task than did large classes, with a 59 percent mean. Thus, the conventional belief that small class size is related to more opportunity for school learning holds true in this study. Incidentally, the smallest class, which was not included in the analysis, had a mean of 86 percent time on task.

It is also important to keep in mind, however, the previous analyses revealing that T & I and AG classes and long classes had the most time on task. A review of table 2 shows that T & I classes were all long, while varying in size from small to medium to large, and that AG classes were both short and medium in length and medium in size. This combination of variables, and others discussed earlier, indicates that no simple and clear set of factors correlates precisely with time on task. Several variables or combinations of variables appear to have implications for time on task, and they must be explored in further studies.

CHAPTER FOUR

SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

Summary of the Findings

The 11,400 minutes recorded in ten different vocational education classes yield a wealth of data about how time was spent by 186 students and ten teachers. Taken alone, the data records a small slice of school life in four communities observed during two weeks in March and April of 1982. As interpreted, the data show the proportions of time spent by teachers on vocational education content and the proportion of time used by students for learning this content (table 6).

TABLE 6

SUMMARY OF FINDINGS OF
STUDENTS' AND TEACHERS' TIME ON TASK

Students' Proportions of Time Spent			
Basic skills	6.74%		
Technical skills	41.17%	55.9% time	
Employability skills	7.99%	on task/content	
Set up/clean up	7.18%	13.2% time	
Related (tutoring, etc.)	6.07%	on task/noncontent	69.1% total time on task
Off task (socializing, etc.)	25.27%	30.9% time	
Break	5.67%	off task	
Absence			
Absence (including minutes tardy)	18.40%		
Teachers' Proportions of Time Spent			
Basic skills	4.10%		
Technical skills	57.30%	67.0% time	
Employability skills	5.20%	on content	
Other, management, etc.	32.70%	32.7% time on content	

Statistical analyses indicate that several factors--class type, class size, class length and classes taught by substitutes--appear to influence the proportion of time students spend on task (figure 6). There was no attempt made, however, to assess the quality of the time used in the classes, nor was there any provision for relating the proportions of time to desired outcome goals or achievement.

Factor	Finding
Day of the week	Somewhat higher proportion of time on task at beginning and end of week (not statistically significant)
Week of observation	Proportion of time on technical skills higher 1st week
Unit of Measure (1 minute) used in study	No difference in time on task when every 3rd or 5th minute compared with every minute
Teacher's time on content	Teachers had 67 percent time on content; student time on content 56 percent (not compared statistically)
Teachers' instructional methods and activities	The single largest percent (29%) of teachers' time spent on one-to-one instruction; 8 percent on lecture; 8 percent on leading discussions
Length of class: long = 146-176 minutes; medium = 111-126 minutes; short = 46-56 minutes;	Long classes had the most time on task (0.05) especially technical skills and set up/clean up; medium classes had the next highest; short classes had the least time on task
Program area	T & I and AG classes had the highest while MDE had the lowest time on task
Substitute teacher	A greater proportion of time on task was found with the regular teacher
Size of class: small = 7 students; medium = 15-17 students; large = 24-26 students	Medium classes had significantly higher proportion of time on task than large classes. The small class which was dropped from analysis had a higher proportion of time on task than the medium classes.

FIGURE 6

OVERVIEW OF FACTORS RELATED TO TIME ON TASK IN VOCATIONAL EDUCATION CLASSES

It is important to bear in mind that this was an exploratory study which limits generalizability of the findings. Nevertheless, the findings provide a beginning data base about time on task in vocational education classes. In addition, methodologies were developed for future time-related research in vocational education classes. Several analyses of variance were conducted to ascertain the differences if other methods or procedures had been used to collect data in the study.

The average proportions of time on task revealed by this investigation corroborate studies conducted in academic subject classes. Of course, the methodologies, terminologies, and proportions of time on task vary widely. There were wide variations of time on task found even among the ten classes in the study, especially on content, which indicate that there are numerous factors contributing to time spent on relevant curricular activities in vocational education classes.

Implications of the Study

The study's exploratory research findings provide a foundation of data rich with implications for educators, policymakers, and other constituents of vocational education. The first implication is that students' time on content appears to be proportionate with the time allocated by teachers. The students' time on content is consistently less than the teachers'. On average, the teachers allocated 67 percent of total class time for content--basic skills, technical skills, and employability skills--while the students spent 56 percent of their time on content. The fact that these proportions are commensurate with proportions in academic classes suggests that students, regardless of curricula fail to take full advantage of the opportunity to learn or to practice skills. A further implication regarding the teachers' influence of students' time on content is evident from the difference when there were substitutes in the classes. Students had consistently less time on content when substitute teachers were in charge.

A second implication is that while teachers may control the time available for content in their classes, other factors also appeared to contribute to the proportion of time students spent on task in the classes observed. Longer classes promoted more time on task than did shorter clases, and classes with lower enrollment had a greater proportion of time on task than did classes with higher enrollments. These findings suggest that the duration and the enrollment of classes are factors to consider when attempting to increase time on task. These findings can also shed some light on the currently debated issue of whether area vocational schools or comprehensive high schools are better suited to offer secondary vocational education. If time on task is a criterion for resolving the issue, then it appears that

area vocational schools in the study may have an edge because they housed all the longer classes.

A third implication is that some program areas fostered time on task more readily than did other program areas. In this study agricultural education (AG), marketing and distributive education (MDE), and trade and industrial education (T&I) represented three distinctive types of vocational education classes. MDE is generally taught in academic-style classes, frequently with a laboratory component where students manage a school store or do other types of hands-on work. These classes offer less opportunity for lengthy and intensive periods of individual practice than do classes of the other two types. Although subject matter can vary extensively in particular AG classes--from urban-based horticultural design to rural-based agricultural mechanics--AG classes can provide many hands-on task experiences during class hours. And T&I classes generally allocate even more of their time for hands-on work in the shop. Task-oriented and seemingly eager to assign individual projects in the shop area, teachers in T&I classes generally limited their lecture time. Thus, because opportunity for long periods of individual hands-on work was found to be conducive to more time on task, classes in the T&I and AG program areas had a significantly higher proportion of time on task than did those in MDE. Of course, this implication must be considered in the light of other factors, such as the teachers' instructional and managerial styles, duration of the class, and enrollment in the class.

A final implication is that the teachers' instructional and managerial methods may be critical to the proportions of time that students spend on content in vocational education classes. This study of vocational education classes shows that over a fourth (29 percent) of the teachers' time was spent walking around the room providing instruction and assistance to individual students or small groups. This pattern differs from the pattern in academic classes, where the teaching modes that correlated highly with time on task were lecture, discussion, and demonstration. Since it was not an objective of this study, however, there were insufficient data collected for useful correlations between teaching modes and students' time on task.

This study provides a foundation of information about the specific ways students and teachers spent time in ten vocational education classes. Statistical analyses imply that there are relationships among a number of factors that appear to influence the proportion of time students spend on task. There are numerous questions that remain to be answered and implications that need to be pursued with additional studies to provide a comprehensive understanding of how time on task can be maximized in different types of vocational education classes.

Recommendations for Further Research

This study was designed to be exploratory, a fact to keep in mind when evaluating the findings. More research is needed to determine the combination of factors--such as size of class, length of class, type of school, and pedagogical methods--that promotes the best proportions of time on and off task in vocational education classes.

No attempt was made to relate achievement of specified outcomes, such as attainment of certain levels of occupational competencies, to the proportion of time spent on technical skills. It is strongly recommended that the time spent on various skills or other activities be correlated with the desired outcomes. Prior to that, of course, it would be helpful to agree upon the desired outcomes or goals for secondary vocational education. The current lack of consensus inhibits any attempts to recommend changes in the curriculum or the instructional techniques. Without a national consensus on desired outcomes or goals, time-on-task research lacks the basis for making recommendations that will increase the effectiveness of secondary vocational education.

Another recommendation for further research is the examination of teachers' managerial activities and instructional methods as they may relate to time on relevant tasks in vocational education classes. There is undoubtedly a relationship, explored only superficially at this time, between the teachers' complex behaviors and the students' varied uses of time. Research into teacher behaviors that increase time on relevant tasks in lecture-oriented, academic classes must be supplemented by further research on those classes, based upon activities for individuals and small groups, that characterize programs in vocational education.

Further research is also needed to determine how well competency based instruction serves the individual students, and whether the numerous programs called "competency based" are indeed that. Observers in this study noted that several teachers felt they had a competency based program of instruction when, in fact, it was merely individually paced and lacked any specific measures of competency. In these classes, students completed projects at their own pace but did not appear to be using any competency guidelines.

It must be reiterated that further research is necessary to determine which type of school--the comprehensive high school or the area vocational school--is more effective in providing vocational education to secondary students. This issue is difficult to resolve because of the diversity in students' motivation for taking classes in secondary vocational education and because of the diversity of the outcomes expected from vocational education.

Finally, it is important to remember that time on task is one of several critical variables in the complex question of educational effectiveness. It is impossible to predict whether time on task will retain its current importance as research accumulates. Long-range research should be initated to develop a data base about time on task in vocational education classes in order to determine whether, over the long run, time spent on task improves the effectiveness and the occupational success of former vocational education students.

APPENDIX A: OBSERVATION GUIDES

Class Observation

Page _____ of _____

Teacher Codes/Content

01 Basic skills with tech skills
02 Basic skills separate
03 Tech skills--theory
04 Tech skills--practice
05 Job SMA
06 Know W/W
07 Work Attitude
08 Other/management, transition

Method

09 Lecturing
09 Asking/answering questions
10 Leading discussion
11 Demonstrating
12 Using audio-visuals
13 Giving directions/instructions (class)
14 Providing individualized instruction
15 Testing/quizzing
16 Making assignments (class/homework)
17 Writing on board
18 Checking out tools/equipment
19 Securing materials out of class
20 Passing out materials
21 Observing students (walking/sitting)
22 Grading papers/projects
23 Working at desk/station in classroom
24 Working in adjoining office
25 Bring out of classroom
26 Waiting; walking between rooms
27 Passing out/collecting papers
28 Talking with other staff (telephone)
29 Disciplining student(s)
30 Repairing equipment/tools
31 Other _____

Time	Date Mo	Date Day	Observer	Site	School	Service Area	Class	Grade	Basic skills W/ tech skills R	Basic skills W/ tech skills C	Basic skills W/ tech skills W	Basic skills separate R	Basic skills separate C	Basic skills separate W	Tech Skills T	Tech Skills P	Job SMA	Know W/W	Work Att.	Waiting/ working	Socializing	Listening (announcements, etc.)	Setting up	Cleaning up	Being disciplined	Out of room (related/academic)	Out of room (nonrelated)	Conf. W/teacher	Talking breaks/lunch	T Codes Content	T Codes Method		Notes: (Unusual circumstances, total students, etc.)
1	:																															
2	:																															
3	:																															
4	:																															
5	:																															
6	:																															
7	:																															
8	:																															
9	:																															
10	:																															
11	:																															
12	:																															
13	:																															
14	:																															
15	:																															

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

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Student Observation

Page _____ of _____

Student Codes

01 Setting up for work	08 Answering/asking questions	15 Helping another student	22 Socializing
02 Practicing skills	09 Discussing (participating)	16 Being helped by another student	23 Other _____
03 Listening/observing	10 Taking notes (lecture/audio visual)	17 Supervising others' practice	24 Other _____
04 Reading	11 Using audio-visuals	18 Cleaning up	
05 Computing	12 Working (related) at another location	19 Being disciplined	
06 Writing	13 Being in another class (math, etc.)	20 Waiting/doing nothing	
07 Combining basic skills	14 Setting up a display	21 Talking with teacher	

Time	Date Mo	Date Day	Observer	Site	School	Service Area	Class	Grade	Basic Skills Separate (✓) 1 R	1 C	1 W	2 R	2 C	2 W	3 R	3 C	3 W	Technical Skills Theory 1	Theory 2	Theory 3	Practice 1	Practice 2	Practice 3	Job S,M,A 1	Job S,M,A 2	Job S,M,A 3	Knowledge W of W 1	Knowledge W of W 2	Knowledge W of W 3	Work Attitudes 1	Work Attitudes 2	Work Attitudes 3	Nonsentent 1	Nonsentent 2	Nonsentent 3	NOTES: (unusual circumstances)
1 :																																				
2 :																																				
3 :																																				
4 :																																				
5 :																																				
6 :																																				
7 :																																				
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

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APPENDIX B: SUPPLEMENTARY TABLES

TABLE 7

ONE-WAY ANALYSIS OF VARIANCE FOR DAY OF THE WEEK AND TIME ON TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	2085.011	521.253	1.514	(0.2040)
Within groups	96	32336.129	344.001		
Total	98	34421.140			

TABLE 8

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR TIME ON TASK

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	70.1953	21.228	1.74	0.62	97	0.538
2	50	67.8574	16.072	(0.055)			

TABLE 9

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR TECHNICAL SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	46.0690	26.002	1.79	2.13	97	0.036
2	50	36.2698	19.451	(0.045)			

TABLE 10

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR BASIC SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	4.8586	9.311	2.16	-1.56	97	0.122
2	50	8.5320	13.672	(0.009)			

TABLE 11

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR EMPLOYABILITY SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	10.1143	24.053	2.58	1.01	97	0.314
2	50	6.0490	14.983	(0.001)			

TABLE 12

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR SET UP/CLEAN UP

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	6.2722	7.656	1.82	-1.81	97	0.421
2	50	7.7514	10.331	(0.040)			

TABLE 13

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR ABSENCE

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	20.7227	14.813	2.77	1.61	97	0.111
2	50	16.7842	8.897	(0.001)			

TABLE 14

PERCENT OF TIME SPENT ON SECONDARY PEDAGOGICAL METHODS/ACTIVITIES BY TEACHERS IN VOCATIONAL EDUCATION CLASSES

PROGRAM AREA Class (Study Code)	No Secondary Method/ Activity Indicated	Observe Students	Give Directions/ Instructions	Demonstrating	Break	Ask Questions Answer Questions	Work at Desk	Participate in Activities	Grade Papers	Other[1]
Agricultural Ed										
Agr. Mechanics (11115)	71.5	7.2	4.1	3.4	0	.7	.7	.2	.5	8.7
Vocational Agr. (22143)	50.9	15.7	8.6	.7	0	14.6	.4	0	.5	7.9
Mean	61.2	11.5	6.4	2.1	0	7.7	.55	.1	.5	8.3
Distributive Ed.										
Dist. Ed. (22233)	52.5	16.6	9.5	8.2	0	5.2	1.3	0	0	6.7
Fash. Merch. (34263)	74.4	3.0	.8	2.1	.8	.1	.7	3.7	0	11.6
Mktg. & Dist. II (46273)	47.6	6.8	4.6	1.0	0	7.2	7.0	5.4	5.9	6.8
Mktg. & Dist. IV (46282)	50.9	7.0	5.9	0	0	13.5	3.9	2.4	4.3	12.1
Mean	56.4	8.4	5.2	2.83	.2	6.5	3.23	2.9	2.6	9.3
Trade & Industrial										
Autobody (47391)	46.7	13.4	21.2	5.6	4.5	.3	1.3	0	0	7.0
Mach. Trades (11323)	78.3	3.0	1.4	6.0	.2	0	.2	0	0	3.3
Mach. Shop (23324)	54.8	5.3	6.9	16.9	5.2	0	5.7	0	1.0	4.1
Mach. Shop (35353)	73.4	1.4	.2	3.0	3.3	0	0	0	0	2.5
Mean	63.3	5.8	7.4	7.8	3.3	.08	1.8	0	.25	4.2
Mean for all teachers	61.1	7.1	6.7	5.7	3.0	2.4	2.2	1.1	1.0	6.5

Note: Secondary instructional methods/activities were observed as occurring with primary method/activity.

Percentage for teachers include ten classes observed in the study; ninety-nine classes observed in total.

[1] Additional secondary method/activities upon which teachers spent low proportions of time in classes:

lead discussion	.9	check out tools/equip.	.4
work in adjoining office	.9	pass out materials	.3
make assignments	.6	use audiovisual materials	.2
out of c' oom.	.6	write on board	.2
lecture	.6	talk with staff	.2
talk to observer	.4	miscellaneous	1.2

TIME ON TASK IN SELECTED VOCATIONAL EDUCATION CLASSES

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TABLE 15

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON TIME ON TASK

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	64.8821	12.245	1.06	-0.42	16	0.682
All Students	9	67.2600	11.906	0.939			

TABLE 16

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON TECHNICAL SKILLS

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	47.6778	21.458	1.79	.80	16	0.437
All Students	9	40.5577	16.026	(0.427)			

TABLE 17

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON BASIC SKILLS

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	5.6503	4.285	1.48	-0.39	16	0.699
All Students	9	6.3771	3.524	(0.593)			

TABLE 18

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON EMPLOYABILITY SKILLS

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	9.0955	13.168	1.22	-0.07	16	0.945
All Students	9	8.6798	11.918	(0.785)			

TABLE 19

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON SET UP/CLEAN UP

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	2.4585	3.132	3.79	-1.27	16	0.222
All Students	9	5.3604	6.094	(0.077)			

TABLE 20

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT OFF TASK

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	34.7917	12.145	1.30	1.41	16	0.179
All Students	9	27.2195	10.647	(0.719)			

TABLE 21

ONE-WAY ANALYSIS OF VARIANCE BETWEEN THREE STUDENTS' MEANS AND MEANS OF THEIR CLASSES FOR TIME SPENT ON ABSENCE

Group	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Three Students	9	0.3983	0.627	80.61	-9.98	16	0.000
All Students	9	19.2573	5.632	(0.000)			

TABLE 22

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND TIME ON TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	2766.4733	1383.2366	4.195	(0.0179)
Within groups	96	31654.4219	329.7334		
Total	98	34420.8952			

TABLE 23

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND TECHNICAL SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	7238.7468	3629.3730	7.524	(0.0009)
Within groups	96	46179.3398	481.0342		
Total	98	53418.0866			

TABLE 24

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND BASIC SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	166.4914	83.2457	0.592	(0.5550)
Within groups	96	13488.5725	140.5060		
Total	98	13655.0639			

TABLE 25

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND EMPLOYABILITY SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	3024.7588	1512.386	4.016	(0.0211)
Within groups	96	36154.7814	376.613		
Total	98	39179.5402			

TABLE 26

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND SET UP/CLEAN UP

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	1789.8683	894.943	13.622	(0.0000)
Within groups	96	6307.9912	65.698		
Total	98	8096.8595			

TABLE 27

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND TIME OFF TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	3440.3239	1720.1619	7.029	(0.0014)
Within groups	96	23494.3203	244.7325		
Total	98	26934.6442			

TABLE 28

ONE-WAY ANALYSIS OF VARIANCE FOR LENGTH OF CLASS AND ABSENCE

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	489.7498	244.8749	1.643	(0.1987)
Within groups	96	14305.2148	149.0126		
Total	98	14794.9646			

TABLE 29

STUDENT-NEWMAN-KEULS PROCEDURE
FOR LENGTH OF CLASS AND TIME ON TASK

Subset 1

Group	Short
Mean	61.1742

Subset 2

Group	Medium	Long
Mean	71.2971	73.9764

TABLE 30

STUDENT-NEWMAN-KEULS PROCEDURE
FOR LENGTH OF CLASS AND TECHNICAL SKILLS

Subset 1

Group	Short	Medium
Mean	31.1273	39.9056

Subset 2

Group	Long
Mean	53.1316

TABLE 31

STUDENT-NEWMAN-KEULS PROCEDURE
FOR LENGTH OF CLASS AND EMPLOYABILITY SKILLS

Subset 1

Group	Long	Medium
Mean	0.8428	7.9675

Subset 2

Group	Medium	Short
Mean	7.9675	15.1636

TABLE 32

STUDENT-NEWMAN-KEULS PROCEDURE
FOR LENGTH OF CLASS AND SET UP/CLEAN UP

Subset 1

Group	Short
Mean	1.7167

Subset 2

Group	Medium
Mean	6.8570

Subset 3

Group	Long
Mean	12.7286

TABLE 33

STUDENT NEWMAN-KEULS PROCEDURE
FOR LENGTH OF CLASS AND TIME OFF TASK

Subset 1

Group	Long	Medium
Mean	20.1600	22.6962

Subset 2

Group	Short
Mean	34.2542

TABLE 34

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND TIME ON TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	5835.0320	2917.5159	9.798	(0.0001)
Within groups	96	28586.8652	297.7693		
Total	98	34421.8972			

TABLE 35

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND TECHNICAL SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	3202.5622	1601.2810	3.061	(0.0514)
Within groups	96	50215.6250	523.0793		
Total	98	53418.1872			

TABLE 36

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND BASIC SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	13.8053	6.9027	0.049	(0.9526)
Within groups	96	13641.2200	142.0960		
Total	98	13655.0253			

TABLE 37

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND EMPLOYABILITY SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	936.5707	469.7852	1.179	(0.3119)
Within groups	96	38239.9427	398.3325		
Total	98	39179.5134			

TABLE 38

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND SET UP/CLEAN UP

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	1757.5881	878.7939	13.308	(0.0000)
Within groups	96	6339.2246	66.0336		
Total	98	8096.8127			

TABLE 39

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND TIME OFF TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	4445.8707	2222.9353	9.489	(0.0002)
Within groups	96	22488.7061	234.2574		
Total	98	26934.5768			

TABLE 40

ONE-WAY ANALYSIS OF VARIANCE FOR PROGRAM AREA AND ABSENCE

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	930.4714	465.2356	3.221	(0.0443)
Within groups	96	13864.4624	144.4215		
Total	98	14794.9338			

TABLE 41

STUDENT-NEWMAN-KEULS PROCEDURE
FOR PROGRAM AREA AND TIME ON TASK

Subset 1

Group	Distributive Education
Mean	58.3012

Subset 2

Group	Trade & Industry	Agriculture
Mean	72.1896	82.4199

TABLE 42

STUDENT-NEWMAN-KEULS PROCEDURE
FOR PROGRAM AREA AND SET UP/CLEAN UP

Subset 1

Group	Distributive Education	Agriculture
Mean	0.8623	6.4150

Subset 2

Group	Agriculture	Trade & Industry
Mean	6.4150	10.2523

TABLE 43

STUDENT-NEWMAN-KEULS PROCEDURE
FOR PROGRAM AREA AND ABSENCE

Subset 1

Group	Agriculture
Mean	9.7530

Subset 2

Group	Trade & Industry	Distributive Education
Mean	19.3058	20.6012

TABLE 44

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND TIME ON TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	719.5989	359.7993	3.537	(0.0438)
Within groups	96	2644.9864	101.7302		
Total	98	3364.5853			

TABLE 45

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND TECHNICAL SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	1903.0191	951.5095	3.464	(0.0464)
Within groups	96	7142.0203	274.6929		
Total	98	9045.0394			

TABLE 46

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND BASIC SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	230.8349	115.4174	0.978	(0.3894)
Within groups	96	3067.3179	117.9738		
Total	98	3298.1582			

TABLE 47

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND EMPLOYABILITY SKILLS

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	18.2027	9.1013	2.018	(0.1532)
Within groups	96	117.2412	4.5093		
Total	98	135.4439			

TABLE 48

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND SET UP/CLEAN UP

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	1440.3897	720.1948	11.269	(0.0003)
Within groups	96	1661.6952	63.9113		
Total	98	3102.0849			

TABLE 49

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND TIME OFF TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	674.2774	337.1387	4.547	(0.0203)
Within groups	96	1927.6252	74.1394		
Total	98	2601.9026			

TABLE 50

ONE-WAY ANALYSIS OF VARIANCE FOR THREE MACHINE SHOPS AND ABSENCE

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	656.5211	328.2605	2.449	(0.1060)
Within groups	96	3484.7570	134.0291		
Total	98	4140.2781			

TABLE 51

STUDENT-NEWMAN-KEULS PROCEDURE
FOR THREE MACHINE SHOPS AND TIME ON TASK

Subset 1

Group	Urban	Rural
Mean	74.3149	78.9188

Subset 2

Group	Urban	Inner
Mean	78.9188	86.5599

TABLE 52

STUDENT-NEWMAN-KEULS PROCEDURE
FOR THREE MACHINE SHOPS AND TECHNICAL SKILLS

Subset 1

Group	Rural	Inner	Urban
Mean	44.2829	46.7422	62.3619

TABLE 53

STUDENT-NEWMAN-KEULS PROCEDURE
FOR THREE MACHINE SHOPS AND SET UP-CLEAN UP

Subset 1

Group	Urban
Mean	6.9500

Subset 2

Group	Rural	Inner
Mean	19.2260	23.6078

TABLE 54

STUDENT-NEWMAN-KEULS PROCEDURE
FOR THREE MACHINE SHOPS AND TIME OFF TASK

Subset 1

Group	Inner
Mean	7.8178

Subset 2

Group	Urban	Rural
Mean	17.5160	18.8310

TABLE 55

ONE-WAY ANALYSIS OF VARIANCE BETWEEN CLASSES WITH OR WITHOUT SUBSTITUTE TEACHERS AND TIME ON TASK

Class Type	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Without Substitute	90	70.2015	17.340	2.60	2.02	97	0.046
With Substitute	9	57.1444	27.986	(0.026)			

TABLE 56

ONE-WAY ANALYSIS OF VARIANCE BETWEEN MEDIUM AND LARGE CLASSES FOR TIME ON TASK

Class Type	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
Medium (15-17 students)	50	73.6246	17.916	1.15	3.88	88	0.0000
Large (24-26 students)	40	59.3042	16.710	(0.657)			

TABLE 57

INTERRATER RELIABILITY FOR STUDENT OBSERVATION GUIDE

Activity Observed	Pearson Correlation Coefficient
Basic Skills	0.9694
Technical Skills	0.5781
Employability Skills	1.000
Set up/Clean up	0.8608
Off Task	0.8716

TABLE 58

INTERRATER RELIABILITY FOR CLASS OBSERVATION GUIDE

Activity Observed	Pearson Correlation Coefficient
Basic Skills	0.9476
Technical Skills	0.9466
Employability Skills	0.7307
Set up/Clean up	0.7742
Off Task	0.9051

APPENDIX C: SUPPLEMENTARY FIGURES

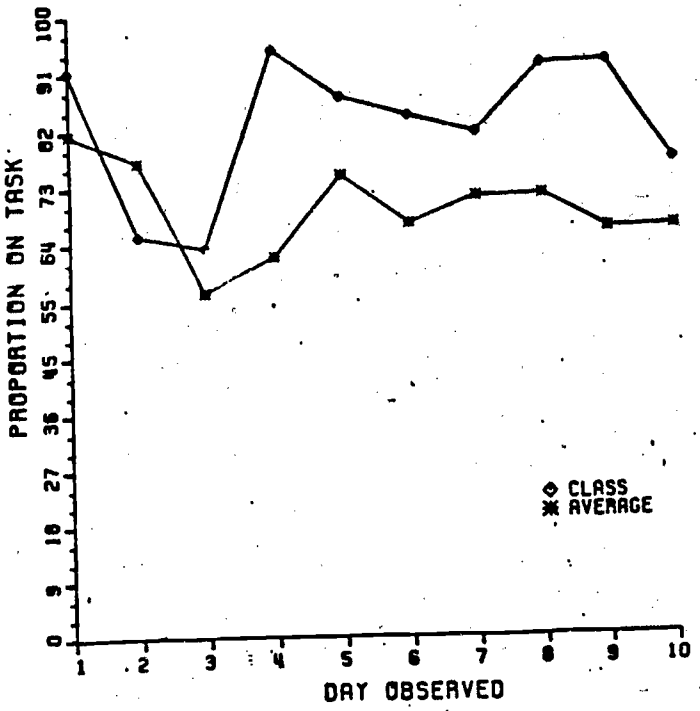

FIGURE 7. PROPORTION OF TIME ON TASK FOR AGRICULTURAL MECHANICS CLASS (11115) COMPARED TO THE AVERAGE OF ALL CLASSES

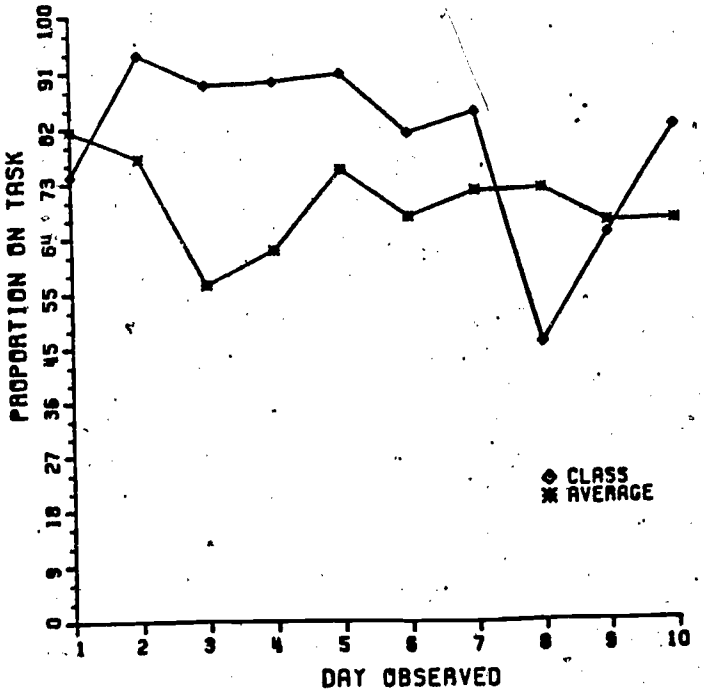

FIGURE 8. PROPORTION OF TIME ON TASK FOR MACHINE TRADES CLASS (11323) COMPARED TO THE AVERAGE OF ALL CLASSES

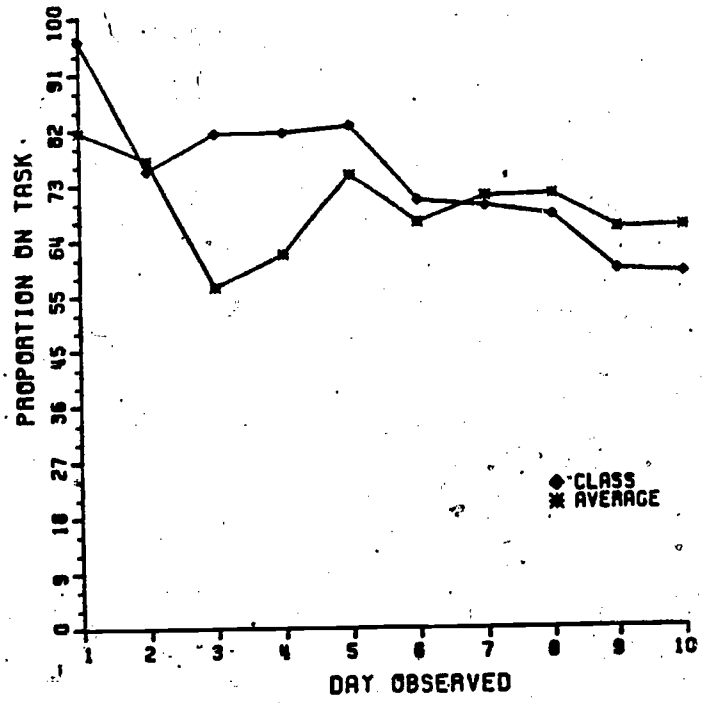

FIGURE 9. PROPORTION OF TIME ON TASK FOR AGRICULTURE CLASS (22143) COMPARED TO THE AVERAGE OF ALL CLASSES

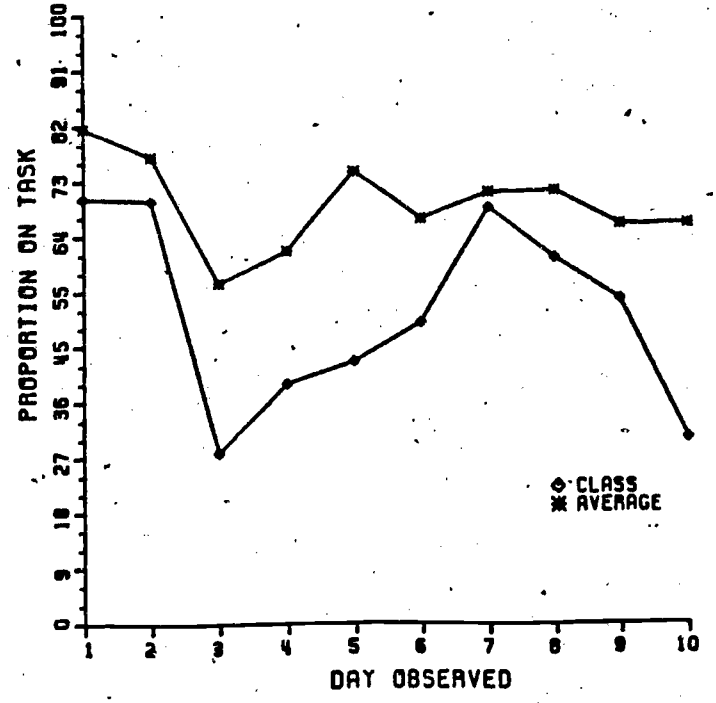

FIGURE 10. PROPORTION OF TIME ON TASK FOR DISTRIBUTIVE EDUCATION CLASS (22233) COMPARED TO THE AVERAGE OF ALL CLASSES

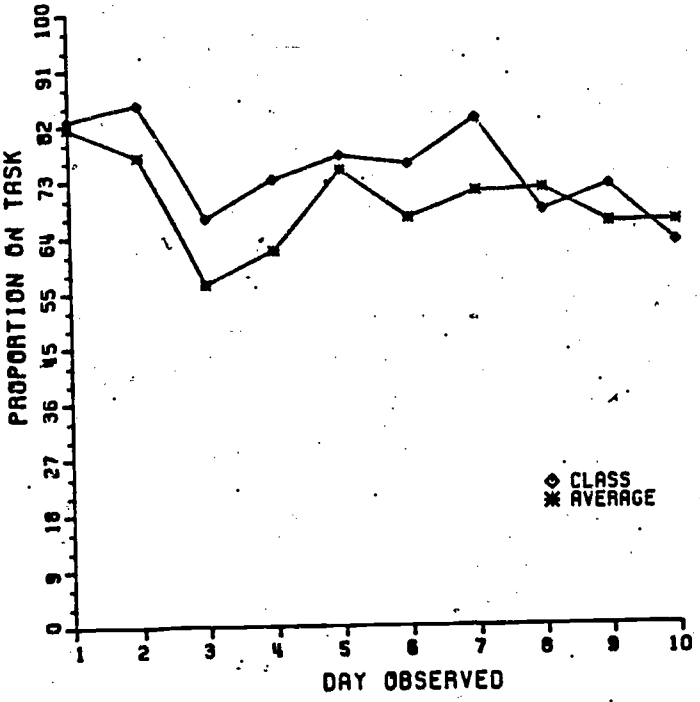

FIGURE 11. PROPORTION OF TIME ON TASK FOR MACHINE SHOP CLASS (23324) COMPARED TO THE AVERAGE OF ALL CLASSES

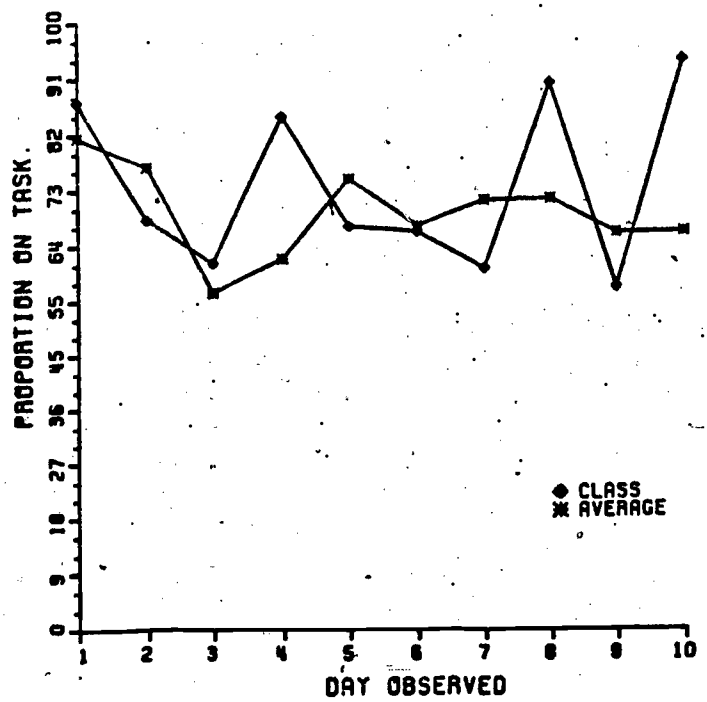

FIGURE 12. PROPORTION OF TIME ON TASK FOR FASHION MERCHANDISING CLASS (34263) COMPARED TO THE AVERAGE OF ALL CLASSES

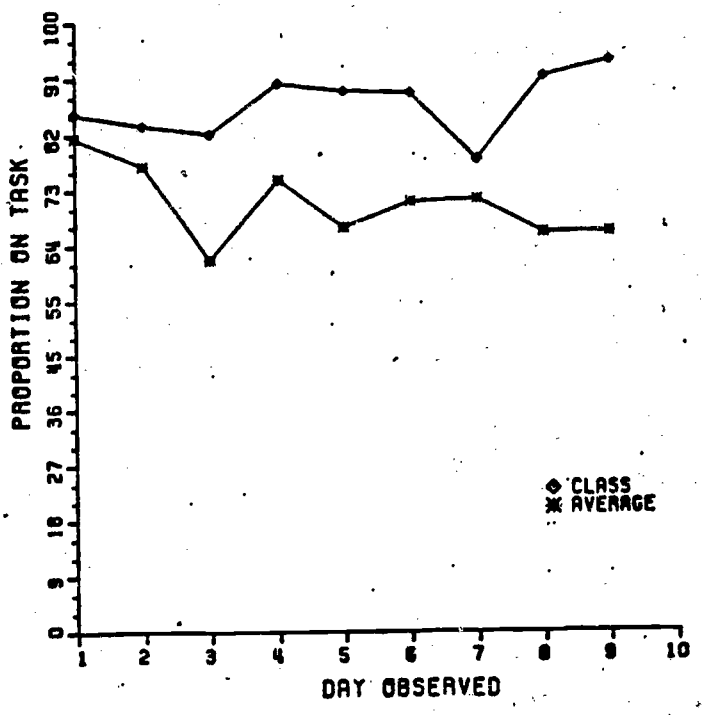

FIGURE 13. PROPORTION OF TIME ON TASK FOR MACHINE SHOP CLASS (35353) COMPARED TO THE AVERAGE OF ALL CLASSES

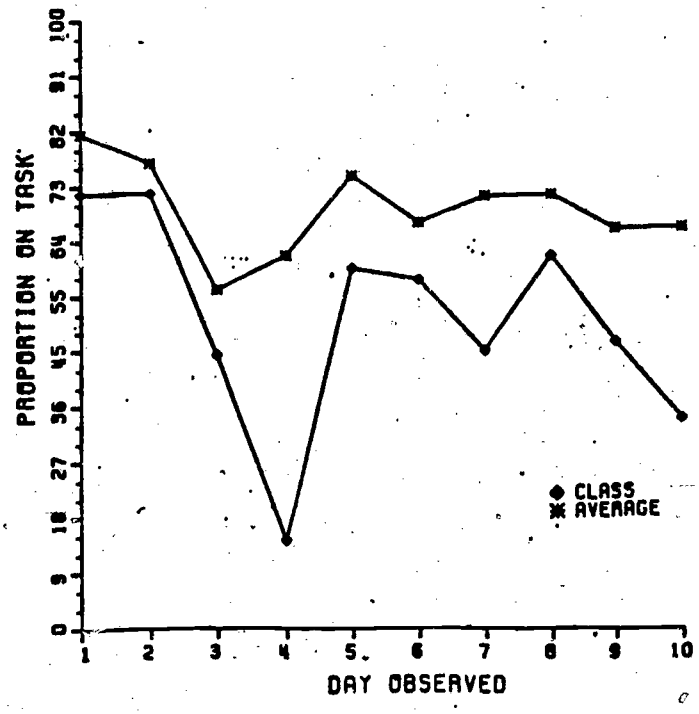

FIGURE 14. PROPORTION OF TIME ON TASK FOR MARKETING AND DISTRIBUTIVE EDUCATION II CLASS (46273) COMPARED TO THE AVERAGE OF ALL CLASSES

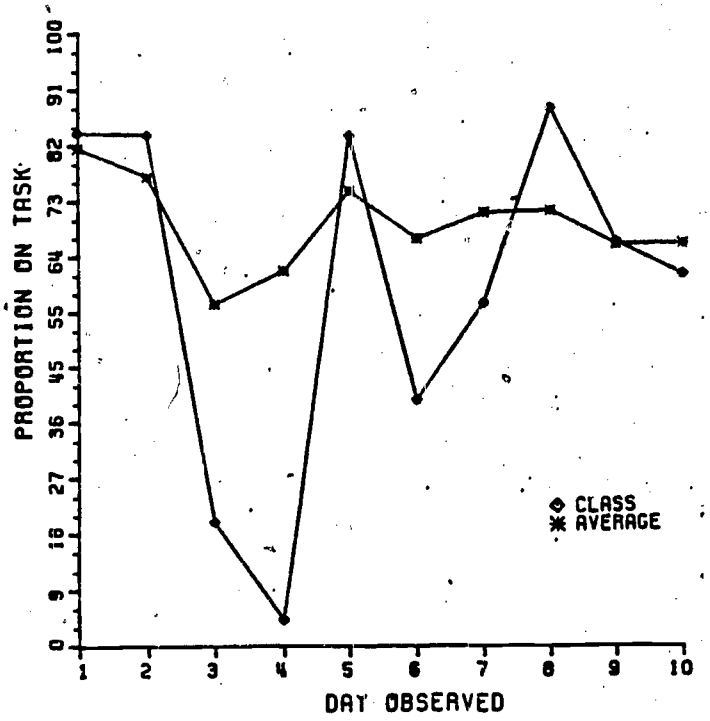

FIGURE 15. PROPORTION OF TIME ON TASK FOR MARKETING AND DISTRIBUTIVE EDUCATION IV CLASS (46282) COMPARED TO THE AVERAGE OF ALL CLASSES

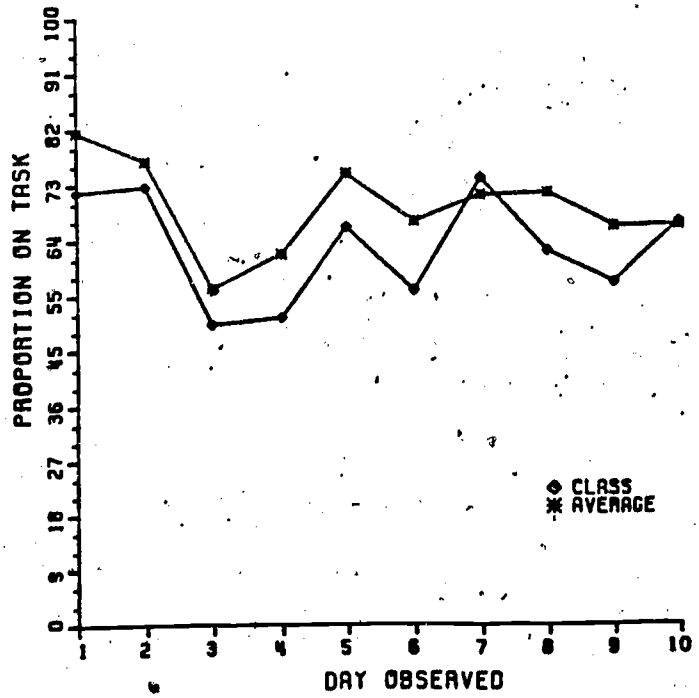

FIGURE 16. PROPORTION OF TIME ON TASK FOR AUTO BODY CLASS (47393) COMPARED TO THE AVERAGE OF ALL CLASSES

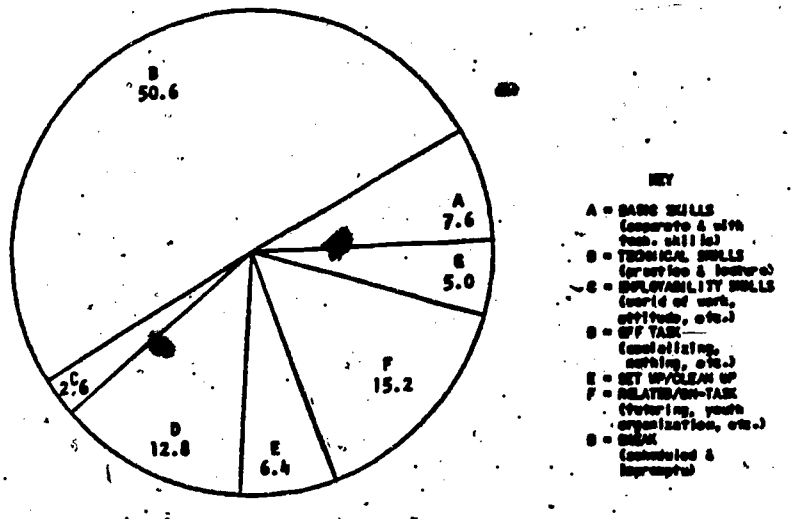

FIGURE 17. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN AGRICULTURAL MECHANICS CLASS (11115) DURING TWO WEEKS OF OBSERVATION

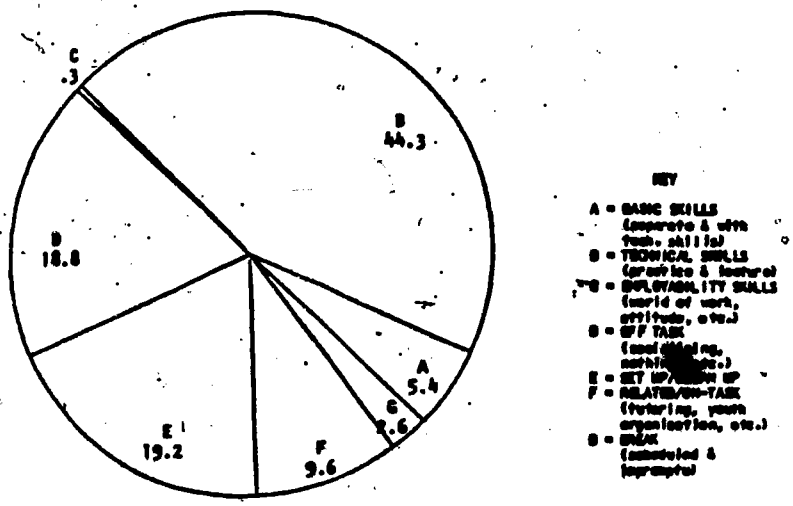

FIGURE 18. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN MACHINE TRADES CLASS (11323) DURING TWO WEEKS OF OBSERVATION

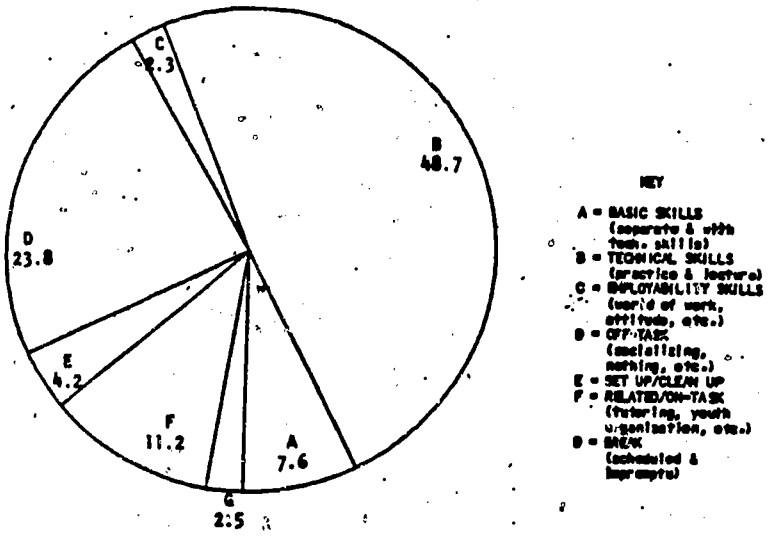

FIGURE 19. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN AGRICULTURE CLASS (22143) DURING TWO WEEKS OF OBSERVATION

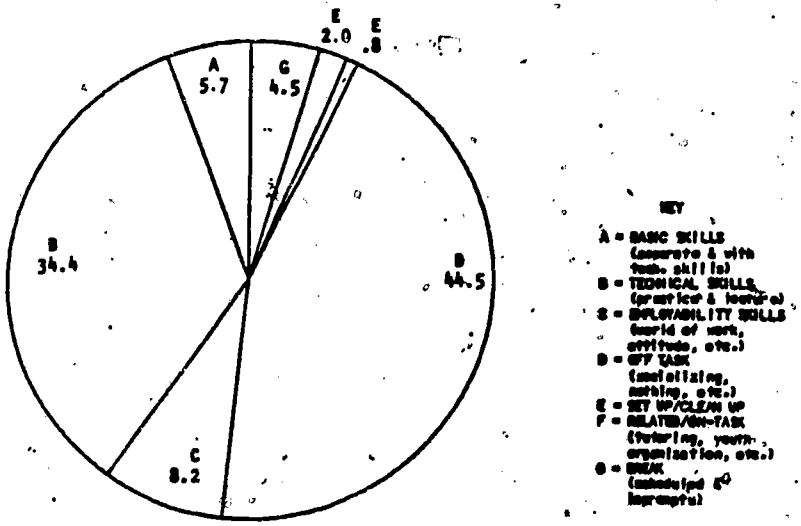

FIGURE 20. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN DISTRIBUTIVE EDUCATION CLASS (22233) DURING TWO WEEKS OF OBSERVATION

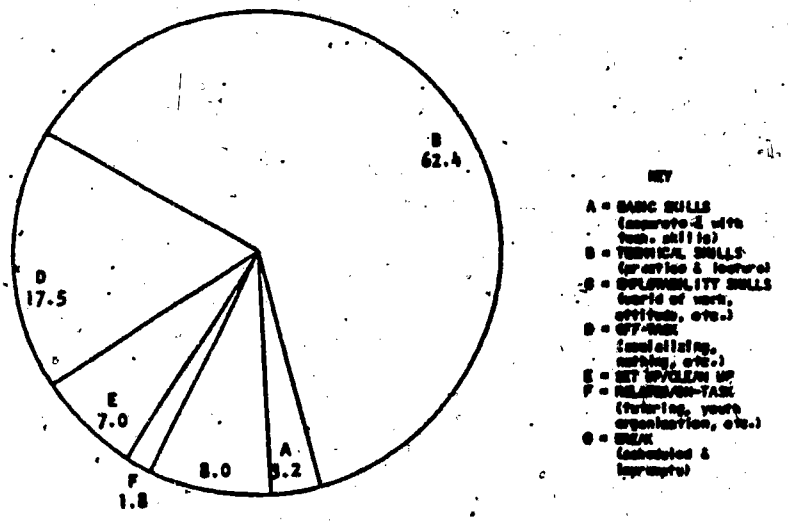

FIGURE 21. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN MACHINE SHOP CLASS (23324) DURING TWO WEEKS OF OBSERVATION

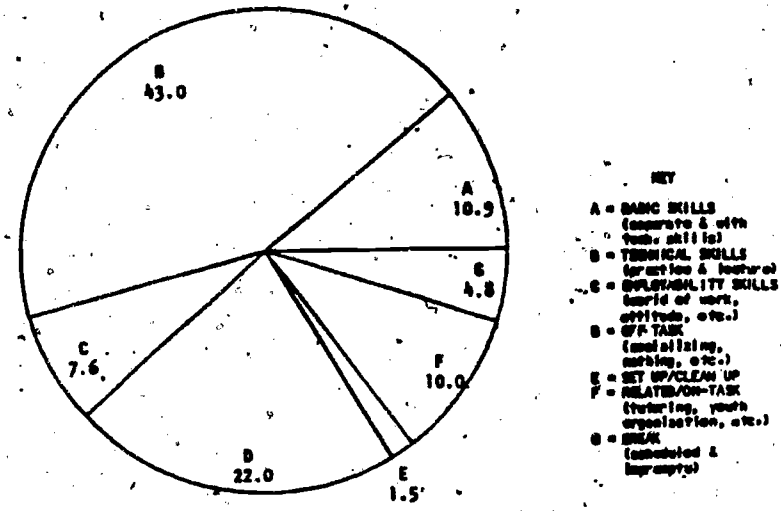

FIGURE 22. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN FASHION MERCHANDISING CLASS (34263) DURING TWO WEEKS OF OBSERVATION

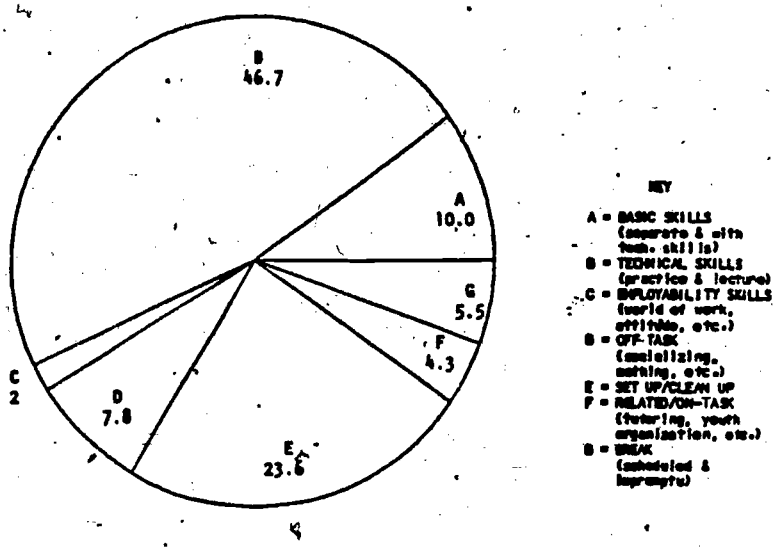

FIGURE 23. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN MACHINE SHOP CLASS (35353) DURING TWO WEEKS OF OBSERVATION

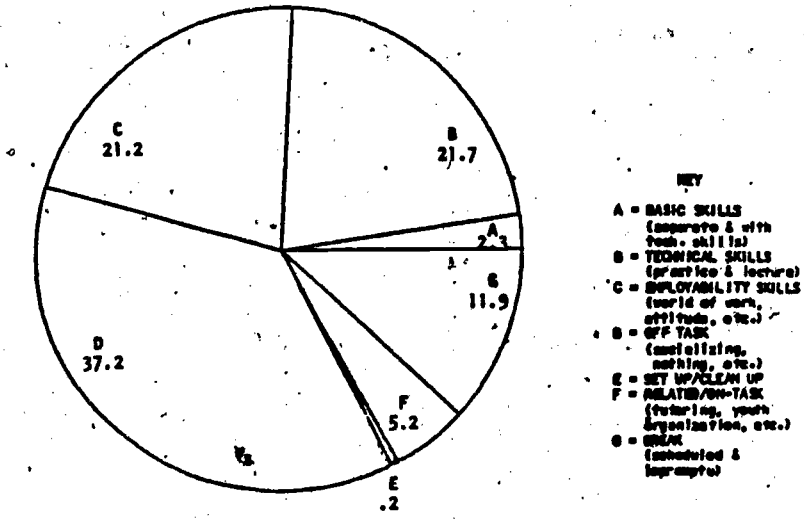

FIGURE 24. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN MARKETING AND DISTRIBUTIVE EDUCATION II CLASS (46273) DURING TWO WEEKS OF OBSERVATION

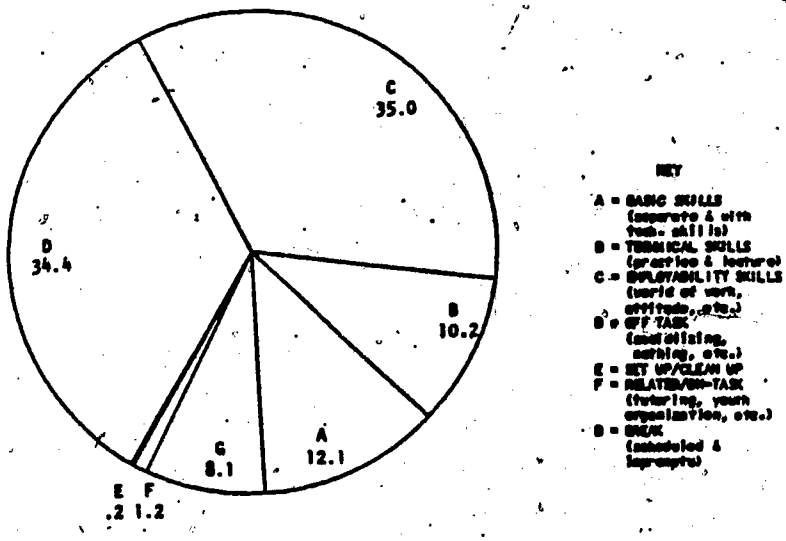

FIGURE 25. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN MARKETING AND DISTRIBUTIVE EDUCATION IV CLASS (46282) DURING TWO WEEKS OF OBSERVATION

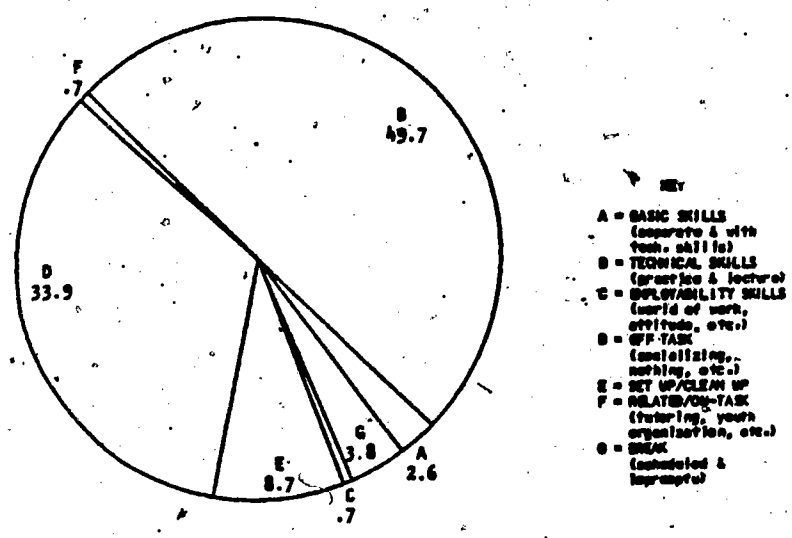

FIGURE 26. AVERAGE PERCENTAGES OF TIME SPENT ON AND OFF TASK IN AUTO BODY (47393) DURING TWO WEEKS OF OBSERVATION

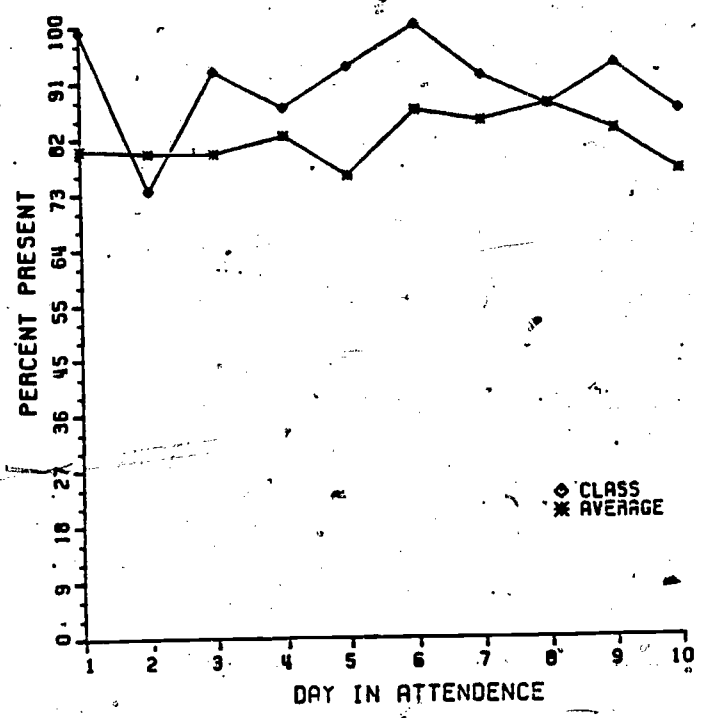

FIGURE 27. PERCENTAGE OF ATTENDANCE FOR AGRICULTURAL MECHANICS CLASS (I1115) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

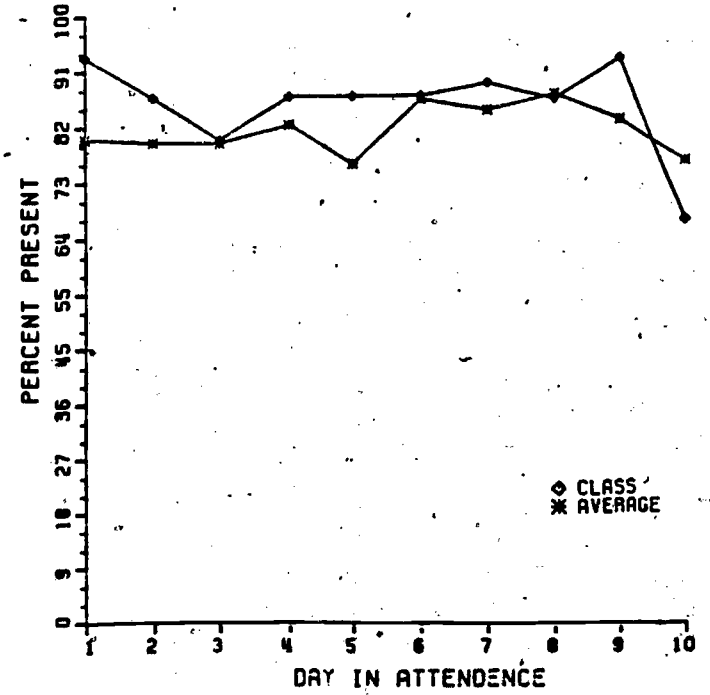

FIGURE 28. PERCENTAGE OF ATTENDANCE FOR MACHINE TRADES CLASS (11323) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

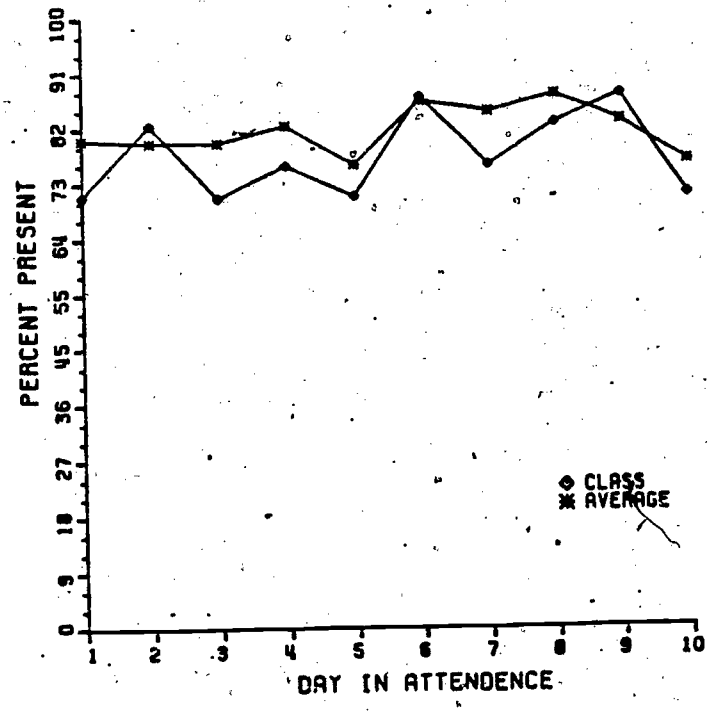

FIGURE 29. PERCENTAGE OF ATTENDANCE FOR AGRICULTURE CLASS (22143) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

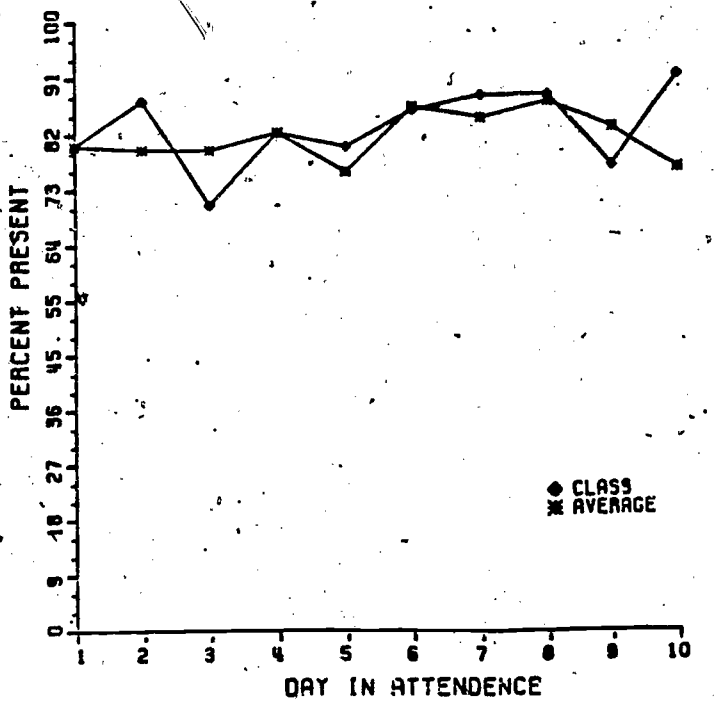

FIGURE 30. PERCENTAGE OF ATTENDANCE FOR DISTRIBUTIVE EDUCATION CLASS (22233) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

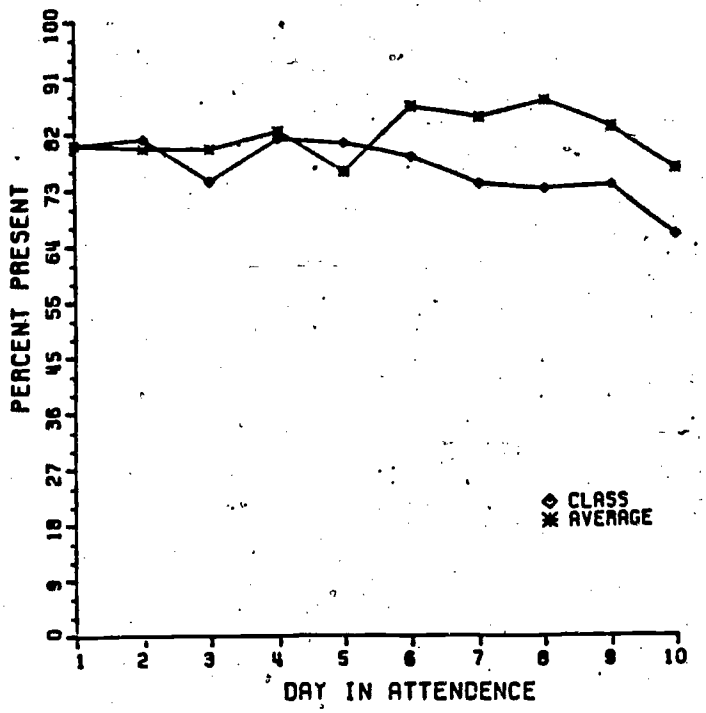

FIGURE 31. PERCENTAGE OF ATTENDANCE FOR MACHINE SHOP CLASS (23324) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

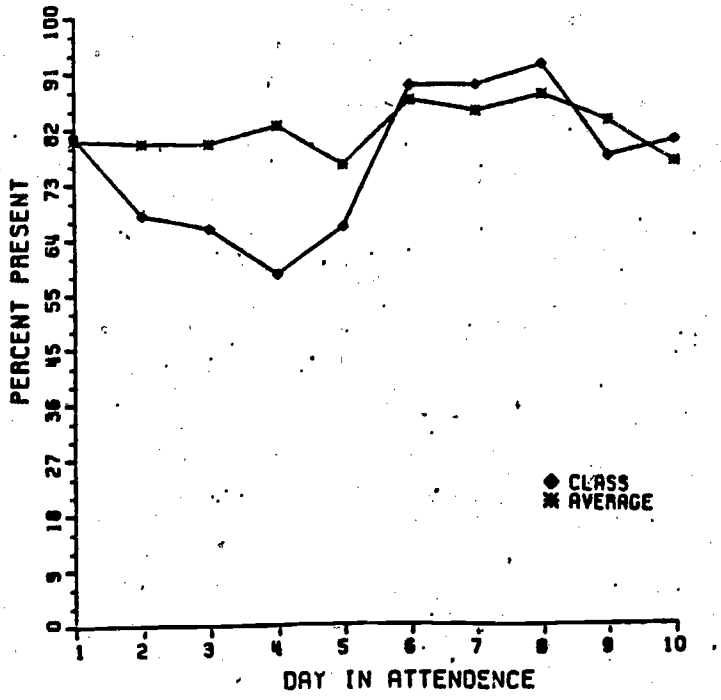

FIGURE 32. PERCENTAGE OF ATTENDANCE FOR FASHION MERCHANDISING CLASS (34263) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

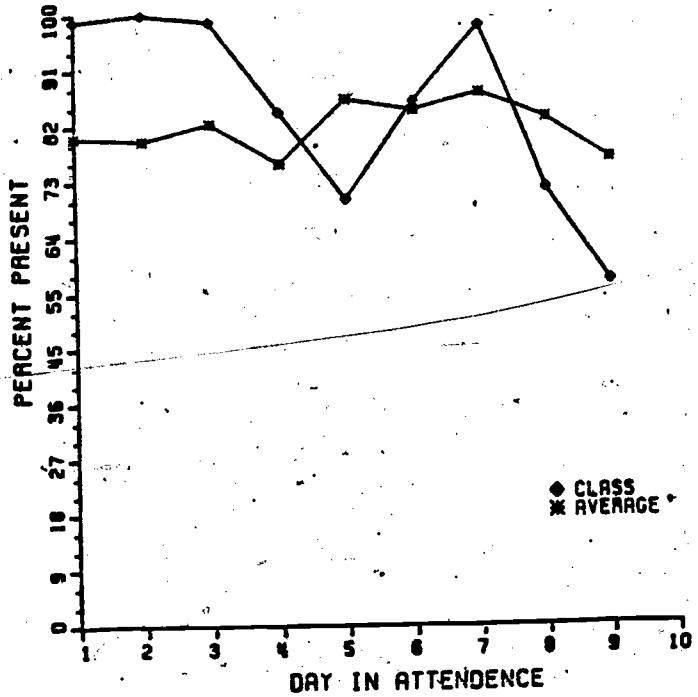

FIGURE 33. PERCENTAGE OF ATTENDANCE FOR MACHINE SHOP CLASS (35353) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

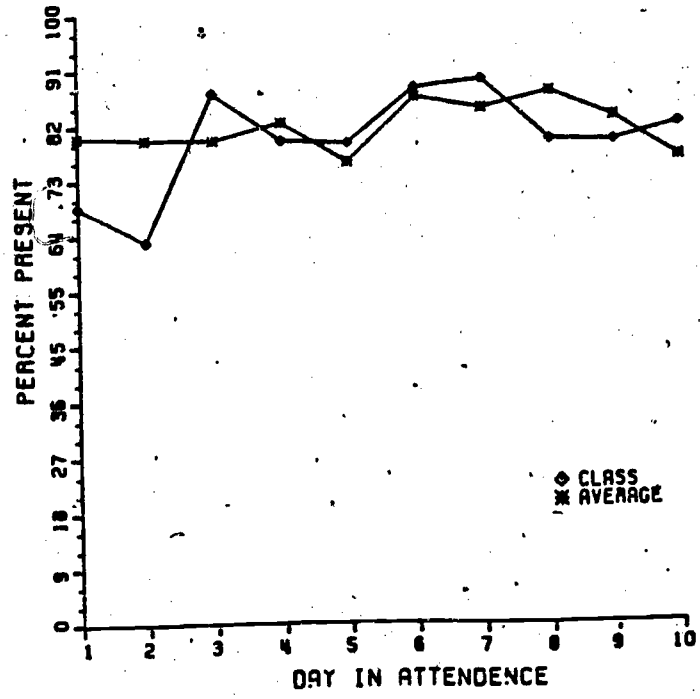

FIGURE 34. PERCENTAGE OF ATTENDANCE FOR MARKETING AND DISTRIBUTIVE EDUCATION II CLASS (46273) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

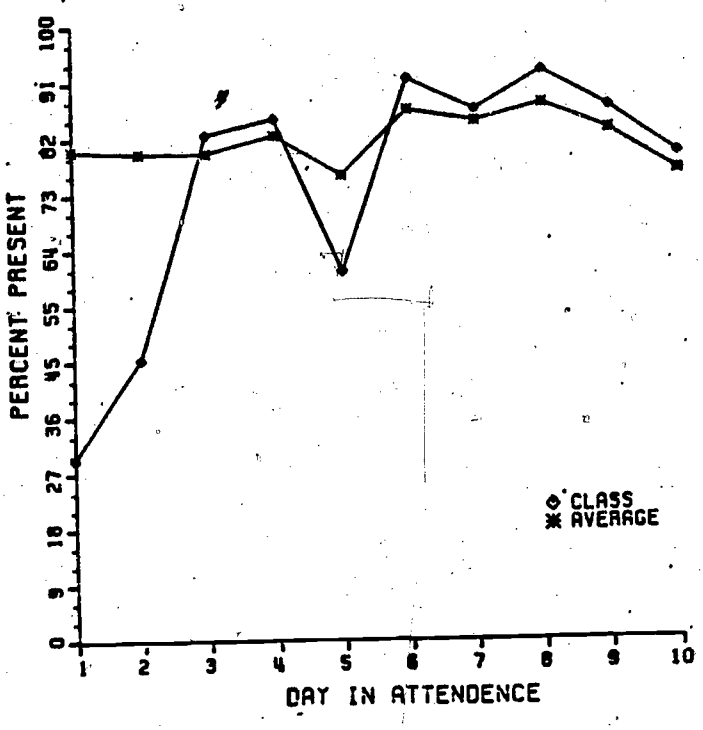

FIGURE 35. PERCENTAGE OF ATTENDANCE FOR MARKETING AND DISTRIBUTIVE EDUCATION IV CLASS (46282) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

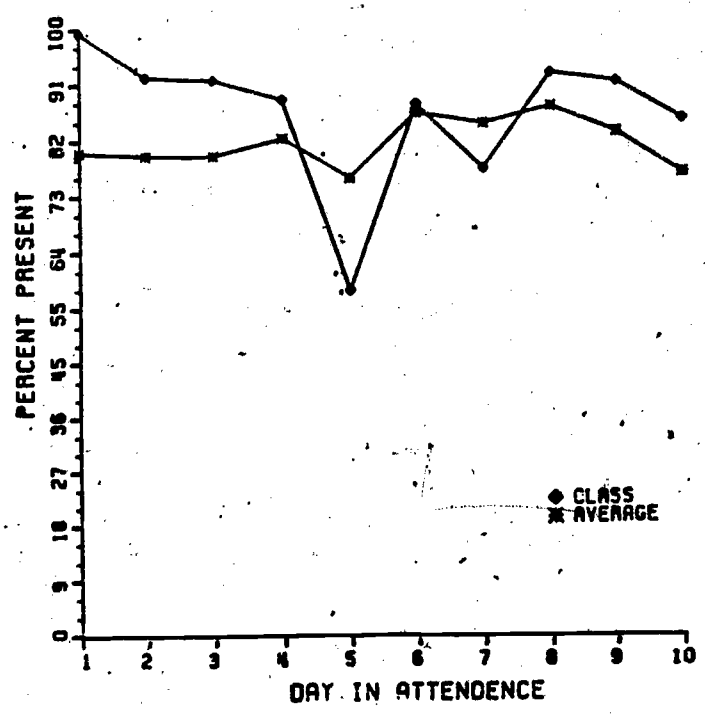

FIGURE 36. PERCENTAGE OF ATTENDANCE FOR AUTO BODY CLASS (47393) COMPARED WITH AVERAGE OF ALL CLASSES DURING TWO WEEKS OF OBSERVATION

APPENDIX D: ERIC ABSTRACTS OF RELATED STUDIES

TITLE Academic Learning Time. The Best of ERIC on Educational Management. Number 65.

INSTITUTION ERIC Clearinghouse on Educational Management, Eugene, Oregon

PUB DATE March 1982

NOTE 5 pages

ERIC NUMBER ED 213 072

ABSTRACT The twelve papers, articles, and reports presented in this annotated bibliography review theories and evidence on the relationship between learning time and academic achievement in elementary and secondary schools. The papers concentrate on three types of learning time: "time on task," which is the amount of time students are actually engaged in learning; "allocated time," the time a teacher schedules for a learning activity; and "academic learning time," the time a student spends successfully learning. Several papers relate time on task to contextual, instructional, and pupil variables and to the match between a particular student and the difficulty of a task. Other papers suggest a model of the relationship of time to learning and note the significance of time in the mastery learning and direct instruction techniques of teaching. A workshop on how to increase academic learning time in the classroom is described in one article, while the final paper examines the relationship of another kind of time, teachers' lesson preparation time, to academic achievement and students' prior achievement levels.

AUTHOR Anderson, Lorin W.

TITLE Learning Time and Educational Effectiveness.

INSTITUTION National Association of Secondary School Principals, Reston, VA

PUB DATE December 1980

NOTE 14 pages

ERIC NUMBER ED 210 780

ABSTRACT To explore the relationship between time and school learning, this paper defines the three kinds of learning time identified by researchers--allocated time, time on task, and academic learning time--and relates them to curriculum development. The author cites evidence that time on task is related to student achievement and describes two instructional approaches that have been associated with high levels of

time on task. The first of these is mastery learning, which includes nine key elements, summarized here in checklist form. The second, direct instruction, has ten key elements and, according to the author, is similar to mastery learning. Central to both is the need for clearly defined goals, communication of expectations to students, and careful monitoring of student progress. The author lists several school districts currently involved in putting the research on learning time and instruction into practice and includes a capsule description of each program. Finally, implications of the learning time concept for instructional and teaching effectiveness are offered.

AUTHOR Anderson, Lorin W.

TITLE Time to Criterion: An Experimental Study.

PUB DATE 1975

NOTE 19 pages; presented at the annual meeting of the American Educational Research Association (Washington, D.C., March 30 - April 3, 1975)

ERIC NUMBER ED 108 006

ABSTRACT The purpose of the study was to investigate the magnitude of individual differences in time-to-criterion and the stability of these differences. Time-to-criterion was defined in two ways: the amount of elapsed time required to attain the criterion level and the amount of on-task time required to attain the criterion level. Ninety students were randomly assigned to either a mastery learning strategy in which all students were helped to attain the 85 percent criterion level or to one of two control classes. All students learned a three-unit sequence of programmed material in matrix arithmetic. The results of the study indicated that time on task to criterion and elapsed time-to-criterion are alterable to the extent that the ratio of the necessary time on task to criterion for the fastest student to the slowest student on the final unit was approximately one to one and two-fifths. Implications for schooling and school learning are discussed. (Author)

AUTHOR Anderson, Lorin W.

TITLE A Measure of Student Involvement in Learning: Time on task

NOTE 24 pages

PUB DATE (none provided)

ERIC NUMBER ED 110 504

ABSTRACT The importance of appropriate task relevant behaviors as a necessary condition for school learning has long been noted. This paper suggests a multiple measure of one set of student classroom behaviors, presents a brief theoretical basis for the measure, provides some empirical support for the use of the measure, and indicates some educational research problems for which the measure is applicable. The empirical evidence (based on three samples of junior high mathematics students (N-137) supports the necessity of using a multiple measure in various learning situations. Suggestions of research problems include an investigation of variables which might be related to and affect task relevant behaviors, and an exploration of the differences between "fast" and "slow" learners.

AUTHOR Benham, Carolyn, ed.; Lieberman, Ann, ed.

TITLE Time to Learn. A Review of the Beginning Teacher Evaluation Study

INSTITUTION California State Commission for Teacher Preparation and Licensing, Sacramento

PUB DATE May 1980

NOTE 250 pages

ERIC NUMBER ED 192 454

ABSTRACT This volume describes the process, findings, and implications of a complex research project known as the Beginning Teacher Evaluation Study (BTES). A major contribution of the study is its focus on Academic Learning (ALT) as a measure of learning. ALT is the amount of time a student spends engaged in academic tasks of appropriate difficulty. The study began as a search for information on which to base policy decisions regarding desirable competencies for beginning teachers. For a variety of reasons the study began to focus on second- and fifth-grade mathematics and reading and on experienced rather than beginning teachers. The book is divided into

three parts with 14 chapters, each by a different author or group of authors. The first describes and analyzes the findings of the study and connects them to a growing body of literature on the importance of time as a key influence on learning. The second explores what the study might mean to teacher educators, staff developers, teachers, and principals. The third section moves the research findings into the schools: a teacher and a principal describe how they use the findings. In addition, policy-making and dissemination are discussed as two essential concerns of large-scale research on teaching and learning, such as the BTES.

AUTHOR Carroll, John B.; Spearritt, Donald

TITLE A Study of a "Model of School Learning." Monograph Number 4.

INSTITUTION Harvard University, Cambridge, Massachusetts, Center for Research and Development in Educational Differences.

PUB DATE 1967

NOTE 18 pages

ERIC NUMBER ED 045 477

ABSTRACT A booklet of a programmed-instruction type was developed to obtain the measures needed to test Carroll's model of school learning, including ability, aptitude, quality of instruction, opportunity for learning, perseverance, and time criterion. Simple rules in an artificial foreign language were taught by means of the booklet to sixth-grade children. Poor quality instruction was found to retard the learning rate of children at all IQ levels, and to be almost as detrimental for children of higher intelligence as for children of lower intelligence. It also resulted in reduced perseverance among high IQ children but had no significant effect on the perseverance of children with IQ's of 115 or below. Statistics were developed to indicate the efficiency of learning under conditions of inadequate opportunity. The empirical data generally confirmed the trends hypothesized in Carroll's model. These findings, if confirmed in other studies, would emphasize the need for good teaching for the more able as well as the less able student. Learning was also shown to be highly inefficient when students had insufficient opportunity for learning. This suggests that learning efficiency measures should be established for children of different intelligence levels for given units of instruction. Such data would allow teachers to assess required amounts of learning time much more accurately than is possible at present.

AUTHOR Cotton, Kathleen; Savard, W. G.

TITLE Time Factors in Learning, Research on School Effectiveness Project: Topic Summary Report.

INSTITUTION Northwest Regional Educational Lab., Portland, Oregon

PUB DATE February 1981

NOTE 113 pages

ERIC NUMBER ED 214 706

ABSTRACT The Alaska School Effectiveness Project produced several reports in a series of reviews of research literature on such topics as time factors in learning. Using an ERIC search and conventional library methods, the question raised was, "Is there a positive relationship between the amount of allocated time for studying a subject and achievement in that subject?" Thirty-five valid studies were reviewed. Based on various findings, it was concluded that the greater the amount of engaged time, the higher the levels of student achievement. Of all measures of student learning time, the rate of academic learning time (ALT) constitutes the best predictor of achievement. It is therefore recommended that: (1) time allocations for different subjects should reflect the relative priorities given to the various subject areas; (2) efforts should be made to keep the amount of classroom "dead time" at a minimum; (3) additional instructional time allotments, preferably in an interactive mode, should be provided for low-ability, low-achieving students; (4) techniques should be applied which can increase the amount of time students spend on task; and (5) activities and methods which result in greater amounts of ALT should be utilized. The document includes item decision displays, a 48 item bibliography, and individual item reports on the citations.

AUTHOR Evertson, Carolyn M.; and others

TITLE Elementary School Classroom Organization Study: Methodology and Instrumentation

INSTITUTION Texas University, Austin. Research and Development Center for Teacher Education

PUB DATE May 1980

NOTE 160 pages

ERIC NUMBER ED 205 486

ABSTRACT The Classroom Organization Study, conducted in Austin, Texas, was designed to answer some very specific questions about establishing and maintaining classroom organization in low socioeconomic status elementary schools that results in greater student time on task, exposure to content, and achievement. The ultimate purpose of the study was to produce knowledge of specfic teacher behaviors that produce effective management of time, instructional materials, contacts between the teacher and students, student participation in classroom activities, and the external constraints imposed on teachers. This report details the history of the study, the training course received by observers, and data collection activities, and summarizes preliminary findings from the study. More effective organizers appeared to: (1) have thought in advance about rules and procedures necessary and to have established them before problems arose; (2) be able to plan activities and procedures with a student's perspective; and (3) introduce independent work gradually. The instruments used by the observers are reproduced in their entirety. The study, from its inception to completion, covered a time period from the school year of 1976-77 to the end of school in the spring of 1978. (JD)

AUTHOR Evertson, Carolyn M.; and others

TITLE Report of the Methodology, Rationale, and Instrumentation of the Junior High Classroom Organization Study, R & D Rep. No. 6100

INSTITUTION Texas University, Austin. Research and Development Center for Teacher Education

PUB DATE February 1980

NOTE 313 pages

ERIC NUMBER ED 189 076

ABSTRACT This report contains a complete record of the methodology and instrumentation of the Junior High Classroom Organization Study. The purpose of the study was to delineate specific effective teacher behaviors. Included in this report are a description of the selection and training of observers, and guidelines for writing narrative descriptions, coding observations, rating student engagement time, and noting time intervals on the narrative record. Sample forms for these procedures are presented. Samples are also given of data collection instruments used throughout the year-long observation period, including questionnaires sent to participating teachers, resulting feedback to teachers, and data analysis instruments.

AUTHOR Fisher, Charles W.; and others

TITLE Selected Findings from Phase III-B. BTES. Beginning Teacher Evaluation Study. Supplement, Preliminary Version

INSTITUTION Far West Lab. for Educational Research and Development, San Francisco, California

PUB DATE May 1978

NOTE 172 pages

ERIC NUMBER ED 160 639

ABSTRACT This series of six papers concerning the Beginning Teacher Evaluation Study (BTES) starts with Teaching Behaviors, Academic Learning Time and Student Achievement: An Overview of Phase III-B of the Beginning Teacher Evaluation Study by the project director, Charles Fisher. As an introduction, it describes a model of classroom instruction based

on the concept of student academic learning time (ALT) as a function of student entering characteristics (aptitude), and teaching behaviors and other classroom content variables. More precisely, ALT is student egagement time with relevant tasks which have a low error rate for that student. The remaining papers were: Methodological Issues and Concerns in Research on the BTES Classroom Learning Model by Leonard S. Cohen; Academic Learning Time and Achievement: The Validation of a Measure of Ongoing Student Engagement and Task Difficulty by Richard Harliave; How Teachers Produce "Academic Learning Time": Instructional Variables Related to Student Engagement by Nikola N. Filby; Changing Academic Learning Time: Clinical Interventions in Four Classrooms by David C. Berliner; and An Analysis of Instructional Time in Grade 2 Mathematics by Cahen and Fisher. An annotated bibliography of 57 documents related to the BTES is appended.

AUTHOR Fisher, Charles W.; and others

TITLE Teaching Behaviors, Academic Learning Time and Student Achievement: Final Report of Phase III-B, Beginning Teachers Evaluation Study, Technical Report V-1

INSTITUTION Far West Lab. for Educational Research and Development, San Francisco, California

PUB DATE June 1978

NOTE 493 pages

ERIC NUMBER ED 103 525

ABSTRACT Four major questions are addressed in this research report: What is the relationship between student academic learning time and student achievement? What are the relationships between teaching processes and academic learning time? Are teaching processes, academic learning time, and student achievement related to student attitudes? Are instructional variables related to retention of achievement over the summer? An Academic Learning Time Model of classroom instruction is presented. Design, instrumentation, and data collection methods of this research project are outlined. Analyses of the joint relationships among the variables--teaching processes, academic learning time, and student achievement--are presented, as well as analyses of student attitudes and retention of achievement.

AUTHOR Fredrick, Wayne C.; Walberg, Herbert J.

TITLE Learning as a Function of Time.

INSTITUTION Illinois University, Chicago. Chicago Circle Campus.

PUB DATE 1980

NOTE 38 pages

ERIC NUMBER ED 206046

ABSTRACT To examine the relationship between time and in-school learning, the authors review a number of empirical and theoretical studies covering all educational levels. They discuss the methods and interpretations of the empirical studies, the effects of time on learning outcomes and of other variables on time on task, and the incidence of diminishing returns to learning from added school or study time. Four methods of measuring time are identified, including years of schooling, days of instruction at school, hours of classes during the day, and minutes of study during class. The authors summarize the effects of these types of time on academic achievement, knowledge, IQ, language and reading level, failure rate, adjustment to school, and attitudes toward education, school work, teaching, religion, and modern life. They also examine two theoretical models relating time to learning: the acceleration model, which allows time to vary until the task is mastered, and the enrichment model, which holds time constant while allowing the amount of learning to vary. From the studies reviewed, the authors conclude that time is a modest predictor of student learning.

AUTHOR Graden, Janet; and others

TITLE Academic Engaged Time and Its Relationship to Learning: A Review of the Literature.

INSTITUTION Minnesota University, Minneapolis Institute for Research on Learning Disabilities.

PUB DATE January 1982

NOTE 54 pages

ERIC NUMBER ED 214 930

ABSTRACT Studies of how children spend their time in school, how teachers' perceptions, and student characteristics affect interactions and the use of time in classrooms, and how the concept of time relates to student achievement

were reviewed in preparation for an investigation of the extent to which different groups of children have different learning opportunities. The intent was to build a data base to be used in relation to current practices of referring, assessing, and placing students of different learning characteristics. Two areas of relevant research are reported: studies of time in relation to achievement and studies of teacher student interaction and student response as dependent on varying teacher expectations and student characteristics. The research on instructional time is discussed in five categories: (1) quantity of schooling, or time in the school day; (2) teacher reports of opportunity to learn; (3) teacher reports of allocated time; (4) direct observation of allocated time; and (5) student engaged time. A conclusion reviews the results of the literature survey and is followed by a list of references.

AUTHOR Guthrie, John T.; And Others

TITLE Impacts of Instructional Time in Reading.

PUB DATE June 1976

NOTE 71 pages: paper presented at the Conference on Theory and Practice of Beginning Reading Instruction, University of Pittsburgh, Learning Research and Development Center, June 1976.

ERIC NUMBER ED 155 645

ABSTRACT Questionnaires were sent to principals and teachers of second and sixth grade children who were part of an Educational Testing Service (ETS) study of compensatory reading programs; the data were combined and analyzed with the original ETS data to determine what effects instructional characteristics had on reading achievement. Within the constraints posed by the particular procedures used, instructional characteristics of reading programs were found to have an impact on reading achievement. The time spent in formal reading instruction is a particular variable that is likely to increase reading achievement. Specifically, the impact of time on achievement was greater for second graders than for sixth graders, for low socioeconomic status children, and in compensatory rather than regular reading programs. The types of instructional emphases (teaching specific skills) had less impact on achievement than instructional time did.

AUTHOR Harnischfeger, Annegret; Wiley, David E.

TITLE Teaching Learning Processes in Elementary School: A Synoptic View. Studies of Educative Processes; Report No. 9.

PUB DATE February 1975

NOTE 86 pages

ERIC NUMBER ED 124 509

ABSTRACT This approach to the study of classroom teaching-learning processes concentrates on pupil time and the various ways in which it is used. The conceptual framework contrasts with most earlier studies that report teacher behavior as the most direct influence on pupil achievement. Two premises form the basis of the framework: (1) The total amount of time devoted to a particular instructional topic is the most important determinant of pupil achievement; and (2) There is enormous variation in learning time for different pupils. The foci of the conceptual model are pupil pursuits and activities, teacher activities being relevant only in the way they influence those of the pupil. The leading organizational concept is an "a priori" concept of time in the Kantian sense. A pupil spends a certain amount of time in school as defined by educational policy. The time factor preconditions educational effects by defining the quantity of schooling. Amounts of schooling have strong, causally interpretable relations to achievement. Pupil activities and time allocations are additionally influenced by outside administrative and and organizational superstructures. Teacher planning and classroom carry through, teacher evaluation procedures, and policy research emerge as unexamined but vital foci for further research.

TITLE Information Collection. Time Leader's Guide. Basic Skills Instructional Improvement Program.

INSTITUTION Research for Better Schools, Inc., Philadelphia, PA

PUB DATE September 1980

NOTE 278 pages

ERIC NUMBER ED 193 200

ABSTRACT The improvement of student engaged time leads to improved instruction and greater academic achievement. Major steps for improving instruction by improving student engaged time are information collection, comparison of information and identification of strategies, selection and

preparation of strategies, and implementation and re-evaluation. This leader's guide, designed to cover the topic of information collection, can be used to: (1) teach procedures for information collection on time; (2) train classroom observers; and (3) collect information on allocated time and engagement rate in classrooms. Instructional materials to be used in this program are included.

TITLE	Junior High Classroom Organization Study. Observer Training Manual, R&D Rep. No. 6102.
INSTITUTION	Texas University, Austin. Research and Development Center for Teacher Education
PUB DATE	January 1980
NOTE	136 pages
ERIC NUMBER	ED 189 073

ABSTRACT This manual was used to train observers for the Junior High Classroom Organization Study, a research project developed to delineate specific effective teacher behaviors. During the training sessions, the following topics were discussed: 1) preliminary results from a previously conducted Third-Grade Classroom Organization Study; 2) concepts and terms used in the study; 3) techniques for writing narratives; 4) procedures for noting time intervals; 5) use of the student engagement rate, time log, and component rating forms; 6) procedures for handing in materials; and 7) how to be an unobtrusive observer. Samples of all data collection instruments are included in the manual.

AUTHOR Karweit, Nancy L.; Slavin, Robert E.

TITLE Measuring Time On Task: Issues of Timing, Sampling and Definition.

INSTITUTION Johns Hopkins University, Baltimore, MD, Center for Social Organization of Schools

PUB DATE June 1980

NOTE 24 pages

ERIC NUMBER ED 204 378

ABSTRACT How various methodological decisions may influence studies of the effect of time on task on achievement are examined. Subjects were students in grades 2-5 in 18 classes taught by 12 teachers in a rural Maryland school district. All students were pretested in February 1978 in reading, language arts, math and social studies using the Comprehensive Test of Basic Skills. A posttest was given in May, 1978. It was found that altering definitions of time-on-task to include momentary off task behaviors affected the conclusions for the importance of time on task. Clear evidence was presented that sampling segments of instruction would tend to obscure the positive results for time on task. It was also shown that reducing the number of days of observation weakened the effects of time on task. However, the timing of the observation was not very important for the noted effects. The effect of sampling fewer than six students was explored and, due to the effect on reliability, it was suggested that although there is an understandable urge to lessen the observation time in order to bolster the number of settings observed, such steps should only be taken cautiously.

AUTHOR Karweit, Nancy; Slavin, Robert E.

TITLE Time-On-Task: Issues of Timing, Sampling and Definition

PUB DATE October 1980

NOTE 22 pages

ERIC NUMBER ED 198 179

ABSTRACT This paper addresses four issues in the design and execution of behavioral observation in classrooms. These four issues relate to the consequences of using

different observation intervals, schedules of observation, student sampling methods, and definitions of on-task and off-task behavior for reliability, means, and correlations of time-on-task and achievement. A field study observed 100 students in 10 elementary classrooms. Pre-and post-achievement data were also collected. The data permit simulations of different intervals, schedules, sampling methods, and definitions for determination of their effects on the outcomes of behavioral observation. Findings suggested that: (1) altering definitions of time-on-task to include momentary off task behaviors affected the conclusions for the importance of time on task; (2) sampling segments of instruction would tend to obscure the positive results for time on task; (3) reducing the number of days of observation also weakened the effects of time on task; (4) timing of the observation was not very important for the noted effects; and (5) reducing the number of students to less than six may adversely affect reliability.

AUTHOR Kazanas, H. C.

TITLE Affective Work Competencies for Vocational Education. Information Series No. 138.

INSTITUTION ERIC Clearinghouse on Adult, Career, and Vocational Education, Columbus, Ohio.

PUB DATE 1978

NOTE 94 pages

ERIC NUMBER ED 166 420

ABSTRACT Recognizing the importance of a curriculum that facilitates the acquisition of desirable, effective work competencies (work attitudes, values, and habits) as well as specific job skills, a study was conducted to review and synthesize what is known about the social and psychological aspects of work and to identify specific affective work competencies that are desirable and common for vocational education programs. The literature review focused on the historical and theoretical perspectives which relate to understanding the behavior of individuals and groups; it also examined the empirical data related to affective work competencies identified by employers, educators, and experienced employees. Based on the combined investigations conducted by industry and education, a variety of affective work competencies was identified. A synthesis of forty-two affective work competencies identified by industry with the fifty-four identified by educators provided a total of sixty-three unique, identifiable affective work competencies. However, the study concluded that there is a lack of continuity between

educational institutions and employing organizations; consequently, some of the affective work competencies identified by educators have been inconsistent with what industry wanted or needed. Moreover, the inability of researchers to identify and objectively measure affective competencies was found in both industry and education, indicating a need for the development of reliable, valid, and objective measuring instruments. Recommendations and guidelines for an affective work competencies inventory are provided.

AUTHOR Lomax, Richard G.; Cooley, William W.

TITLE The Student Achievement-Instructional Time Relationship

PUB DATE April 1979

NOTE 30 pages: paper presented at the annual meeting of the American Educational Research Association (63rd, San Francisco, CA, April 8-12, 1979)

ERIC NUMBER ED 179 598

ABSTRACT Ten studies investigating the relationship between instructional time and achievement on elementary school reading and mathematics tests were reviewed. The studies involved general classroom research, instructional time research, and attention research. The review indicated that the relationship between academic achievement and instructional time was not as strong as generally believed. It was felt, however, that the relationship would have been stronger if certain methodological problems were reduced. The following suggestions were offered: (1) use engaged time (time on task) as a more valid estimate of instructional time than time allocated by teacher logs; (2) use a causal model for achievement to interpret correlations; (3) use achievement tests having a substantial overlap with curriculum; (4) minimize the probability of making a Type I error by not including a large number of variables in the observation; (5) sample as much instructional time as funds permit; (6) minimize data collection errors and ceiling effects; and (7) investigate other variables such as sex, socioeconomic status, ability level, grade level, or instructional content; then causal models for achievement can be formulated. (The results of the studies are summarized and compared in tables).

AUTHOR Marliave, Richard

TITLE Academic Learning Time and Achievement: The Validation of a Measure of Ongoing Student Engagement and Task Difficulty

PUB DATE March 1978

NOTE 29 pages: paper presented at the annual meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada. March 27-31, 1978)

ERIC NUMBER ED 160 661

ABSTRACT A model of Academic Learning Time (ALT) is described, where ALT represents ongoing student learning in terms of student engagement, low student error rate, and relevance of the instructional task to the specified outcome. This model was validated in a correlational study of the relationship between these variables and student achievement in reading and mathematics. Achievement tests were administered to 139 second grade and 122 fifth grade students. ALT was measured during the inter-test period by direct observation and with records kept by teachers. These data were used to obtain student engagement rates, student error rates (low, medium, and high) and provided data on the instructional time allocated by specfic content areas within reading and mathematics. Allocated time, engagement rate, and low error rate were found to be positively associated with student learning, while high error rate was negatively associated. These effects were generally consistent across both grade and content area. The set of four ALT variables accounted for an average of about 11 percent of the residual variance in achievement. These analyses provide strong support for the relationship of ALT to student learning.

AUTHOR Martin, Oneida; Canty, Althia

TITLE Instructional Behaviors that Enable Teachers to Maximize Allocated Classroom Time.

PUB DATE November 1980

NOTE 33 pages: paper presented at the annual meeting of the Mid-South Educational Research Association (New Orleans, LA: November, 1980)

ERIC NUMBER ED 206 500

ABSTRACT Data for this study were collected by observing 60 secondary school English classes over a four-month period. The principals of six schools chose 15 of their

most effective teachers to be observed. Four questions were addressed: (1) How do teachers and students spend classroom time together? (2) What instructional processes are used most often? (3) How much time do these processes require? and (4) Which instructional processes enable teachers and students to attain educational objectives within the available classroom time? Analysis of the descriptive time narrative logs showed that allocated classroom time and instructional behavior varied among the teachers, although most of the time and behaviors were directed toward explaining a process, addressing questions to a class, repeating student responses, and giving students directions. The conclusions drawn from the study support previous research concluding that teachers who are task oriented and who plan and organize instruction allot more time to academic tasks and activities and that this behavior achieves instructional goals.

AUTHOR Probst, Daniel

TITLE A Study of Time On Task in Three Teachers' Classrooms Using Different Instructional Modes. Report from the Project on Studies of Instructional Programming for the Individual Student.

INSTITUTION Wisconsin University, Madison. Research and Development Center for Individualized Schooling.

PUB DATE November 1980

ERIC NUMBER ED 196 905

ABSTRACT This study investigated differences occurring in student time utilization in three teachers' classes. In Class A, the teacher used a large group instructional mode; in Class B, the teacher used a small group instructional mode; and in Class C, the teacher used an individualized instructional mode. The subjects were 60 eighth grade students from a large urban middle school. A time sampling observation system was used to record student time on task, student time off task, and sanctioned noninstructional time. Students completed a locally constructed mathematics test at the end of the study. Scores from this test were used to classify students in one of three achievement levels: high, middle, or low. Results of comparisons performed on time on task indicated that high and middle achievers spent significantly more time on task than low achievers. No difference was found between high and middle achievers. The comparisons also indicated no significant difference in time on task for any one of the three levels compared between any two of the three teachers' classes. No significant

differences were found between any two achievement levels for sanctioned noninstructional time. There were three significant comparisons between achievement levels and sets of teachers' classes. The middle achievers in Class A differed from the middle achievers in Class B; the low achievers in Class A differed from the low achievers in Class B; and the low achievers in Class C differed from the low achievers in Class B.

AUTHOR Rosenshine, Barak Victor

TITLE Academic Engaged Time, Content Covered, and Direct Instruction

PUB DATE 1978

NOTE 39 pages

ERIC NUMBER ED 152 776

ABSTRACT The author notes a shift in educational research from teachers' behaviors as related to student achievement gains to other factors affecting such gain. A review of studies published since 1973, and an exploration of some of their concepts, is undertaken. Major changes are summarized as (1) increased focus on student variables, (2) a convergence of results supporting "direct instruction," and (3) information on the relation between seatwork and discussion to gain in achievement. The literature review is limited to basic skills (reading and mathematics) in grades one through five. Major concepts examined are "academic engaged time" (time students spend in moderately difficult, academically related material) and "direct instruction" (activities directly related to making progress in reading and mathematics) and to settings promoting those activities. Seven variables reflecting management and organization of the classroom, and thus affecting achievement gain, are discussed: teacher role, student choice of activity, grouping, class management, seatwork, discussion, and atmosphere. Research has indicated that it is the formal model of instruction, with its behavior-analytic, detail-specific, teacher-directed, large-group, narrow-questioning technique, which is most effective for promoting gains in reading and mathematics. A discussion of the relative value of this didactic approach to more heuristic models is presented. Major projects remaining in didactic instruction research are noted for the seven variables listed.

AUTHOR Schmidt, William H.

TITLE The High School Curriculum: It Does Make a Difference

INSTITUTION Michigan State Uni., East Lansing, Institute for Research on Teaching.

PUB DATE May 1981

NOTE 93 pages

ERIC NUMBER ED 213 093

ABSTRACT The question examined in this paper is whether variability in the quantity of schooling students receive in different curricular areas is a contributor to observed differences in achievement not only among students attending different high schools, but among students in the same high school. A conceptual framework enumerates the determinants of achievement, including school and community characteristics, student background, and quantity of schooling in the specific curricular areas of mathematics, English, foreign language, fine arts, social studies, and science. The sample used was 9,195 high school seniors in 725 schools taken from the National Longitudinal Study of the High School Class of 1972, a nationally representative probability sample of high school seniors. The results suggest that quantity of schooling has a positive effect on academic achievement. The more the achievement is school-related, the larger is the resulting effect of the quantity of schooling. This was especially true for mathematics. Quantity of schooling also had positive effects on achievement in science and English; less clear results were found in the areas of vocabulary and reading comprehension, although quantity of schooling did continue to have a positive effect on achievement.

AUTHOR Sirotnik, Kenneth A.

TITLE The Contextual Correlates of the Relative Expenditures of Classroom Time on Instruction and Behavior: An Exploratory Study of Secondary Schools and Classes. A Study of Schooling in the United States. Technical Report Series No. 26.

INSTITUTION California University, Los Angeles. Graduate School of Education

PUB DATE 1981

NOTE 61 pages

ERIC NUMBER ED 214 894

ABSTRACT The premise for an exploratory study of classroom instructional activities was that a positive and substantial correlation exists between achievement and instructional time. The proportion of time that teachers spent on instruction was compared to time devoted to student discipline and control. Three contextual variables were measured through questionnaires completed by students and teachers in secondary school classrooms: (1) teacher demographic and personal perceptions; (2) aggregated student perceptions of class climate, instructional practices, and course content; and (3) demographic characteristics of students. Trained observers recorded teacher student interactions in the classroom, focusing on who was doing what to whom, how, and in what context. The findings have implications for future educational research. Data suggest that time spent by teachers on behavior management may be easier to predict than the time spent on instruction. There appear to be sufficiently important differences between senior and junior high school classes to warrant studying them separately to understand "quantity of schooling" hypotheses at the secondary school level. The need for control of differences between subject areas when analyzing classroom time variables emerged as an important factor, although the reason for this was not clear. A weak association was found between most teaching variables and the proportion of class time spent on instruction and behavior. Tables are appended showing the data found for each variable.

AUTHOR Sirotnik, Kenneth A.

TITLE What You See Is What You Get: A Summary of Observations in Over 1000 Elementary and Secondary Classrooms. A Study of Schooling in the United States. Technical Report Series, No. 29.

INSTITUTION California University, Los Angeles. Graduate School of Education

PUB DATE 1981

NOTE 45 pages

ERIC NUMBER ED 214 897

ABSTRACT Data from observations of 129 elementary, 362 junior, and 525 high school classes were analyzed to raise questions about classroom environment and classroom practices. Results gathered from four instruments are discussed: (1) physical environment inventory, which recorded classroom architectural arrangement, seating, and grouping patterns, furnishings, and materials and equipment; (2) daily summary, which provided an overview of the space and materials available as well as the decision-making processes in evidence by students and teacher; (3) five-minute interaction, which was continuous accounting of how time is spent in the classroom and focused on the teacher and student-teacher interactions; and (4) classroom snapshots, which provided information about what each adult and student is doing in the classroom, the size of the student groups, and the nature of activities in progress. Data gathered from these instruments are analyzed with both "narrow" and "broad" perspectives. The narrow perspective concludes that further research is necessary concerning teaching practices in the context in which they occur. The broader view concludes that the data collected represents an educational scenario that fits the wishes of neither education providers nor recipients. Concluding remarks are made about the processes and necessity of educational change. Tabular presentations are made of some of the data anayzed for this study.

AUTHOR Stallings, Jane A.

TITLE Changing Teacher Behavior: A Challenge for the 1980's

PUB DATE April 1981

NOTE 39 pages: paper presented at the annual meeting of the American Educational Research Association (Los Angeles, CA, April, 1981).

ERIC NUMBER ED 200 596

ABSTRACT A training program for changing teachers' classroom behaviors was developed after observations indicated that students gained in reading skills when teachers spent more time instructing, discussing homework, and providing supportive feedback. During workshop sessions teachers were encouraged to: (1) decrease time taken to make assignments and increase instruction time; (2) ask short questions and give immediate supportive feedback to responses; (3) distribute questions among the students, choosing questions each student could most likely answer; (4) give short quizzes designed to allow the students a high rate of success; (5) have the students in the low reading groups read aloud; (6) encourage more reading aloud, discussion, and review, and ask for fewer written assignments and less silent reading; (7) minimize intrusions from outside the class; and (8) keep the number of choices students may make at a minimum. A posttest of student reading achievement in classes where the teacher had attended the workshops showed that the treatment group had higher grade gains than the control group.

AUTHOR Stallings, Jane A.

TITLE Classroom Research: Implications for Mathematics and Science Instruction

INSTITUTION Stallings Teaching and Learning Institute, Mountain View, Calif.

PUB DATE November 1980

NOTE 24 pages: paper presented to the Biological Science Curriculum Study Conference (Boulder, CO, November 7, 1980). Contains occasional light type.

ERIC NUMBER ED 211 355

ABSTRACT Presented is a review of findings from research of teaching in the 1970's. It is noted most research was directed toward identifying effective instructional strategies for low achievers, and may not generalize to high achievers. Information is related to student time on task, length of school day, academic time, allocation of time to specific activities, teacher focus of instructor, and interactive instruction. Details of a study on mathematics instruction conducted in 11 San Francisco Bay urban and suburban high schools are provided. The main conclusion is that students in general mathematics classes may not receive the teacher attention and instruction required to achieve well and continue in mathematics. Next, a report on differential treatment of men and women in mathematics classes found differences in geometry classes, but these did not relate to the enrollment of women in advanced mathematics. This document asks if the instructional strategies found effective in reading and mathematics are effective for science classes. An observation system that can be used in science classrooms so that instructors can answer questions about teaching practices is detailed. A study using these techniques to describe effective science teaching is called for, and the need for renewed research in science programs is expressed.

AUTHOR Stallings, Jane A.

TITLE The Development of the Contextual Observation System

INSTITUTION Stanford Research Inst.; Menlo Park, California

PUB DATE March 1978

NOTE 13 pages: paper presented at the annual meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31, 1978)

ERIC NUMBER ED 166 211

ABSTRACT The development of a contextual classroom observation system is described. The system consists of an instrument, trained observers, data handling, and analysis. Thus, instrument development was necessarily paralleled by the development of training procedures, data recording and processing systems, programming, and analytic techniques. The comprehensive observation system described was initially developed for use in the evaluation of Head Start and Follow Through Programs, but has received wide application and has led to the development of a number of derivative observation systems. Data collection forms concerning the physical classroom environment, the snapshot of the classroom, and five-minute samples of interpersonal relations are included.

AUTHOR Stallings, Jane A.

TITLE The Importance of Multiple Data Collection Instruments When Describing the Educational Process

INSTITUTION Stanford Research Institution; Menlo Park, California

PUB DATE April 1977

NOTE 11 pages: paper presented at the annual meeting of the American Educational Research Association (61st, New York, New York, April 408, 1977)

ERIC NUMBER ED 142 572

ABSTRACT A complex research and development process is required to study instructional processes and student outcomes effectively. In order to study the instructional process it is essential to select or develop instruments

that can describe a total event. Understanding the classroom process necessitates having a record of the environment, the materials, the interactions, and activities of the teacher and children. The first step in studying instructional process is to examine and specify the critical components of the classroom or the teaching program being studied. The next step is to identify or develop an observation instrument to record these critical components reliably. It is especially important to select appropriate statistical procedures since observation data often form J-shaped curves that defy analysis using conventional parametric procedures.

AUTHOR Stallings, Jane A., and Giesen, Philip A.

TITLE The Study of Reliability in Observational Data. Occasional Paper 19.

INSTITUTION Phi Delta Kappa, Bloomington, Ind. Center on Evaluation and Research.

PUB DATE February 1977

NOTE 23 pages: revised version of a paper presented at the annual meeting of the American Educational Research Association (58th, Chicago, Illinois, 15-19 April 1974)

ERIC NUMBER ED 148 893

ABSTRACT Observer reliability and the confusability of codes, two sources of error in the collection of classroom observational data, are examined. Confusability is defined as the extent to which one code is mistakenly recorded as another code. Observational data were collected in each of 172 first grade and 171 third grade Follow Through and comparison classrooms in urban and rural locations throughout the U.S. One section of the Stanford Research Institute's classroom observation instrument was analyzed for confusability of codes. Twenty simulated classroom situations were videotaped and coded by 63 trained observers. Matrices listing all the codes were constructed for each observer. The observer's coding was recorded so that their errors would be detectable, and coding errors were analyzed. Separate tables presented each observer's criterion video tape accuracy rate by sponsor, site, and grade level. Analyses of these matrices were also used to study the confusability of the codes. The results showed that the high rate of confusability of several observers could have been caused by overlapping code definitions, poor video tape examples, or inadequate training.

AUTHOR Talmage, Harriet; Rasher, Sue Pinzur

TITLE A Study of the Effects of Three Dimensions of Instructional Time on Academic Achievement.

PUB DATE April 1979

NOTE 21 pages: paper presented at the annual meeting of the American Educational Research Association (San Francisco, CA, April 8 - 12, 1979)

ERIC NUMBER ED 173 327

ABSTRACT In examining three dimensions of instructional time (teacher preparation time, student homework time, direct in-class instructional time), the objectives of this study were to determine which dimensions or combinations of dimensions correlate with achievement, and whether the dimensions differentially affect achievement based on grade and ability level. Elementary students were given instruction in a nutrition curriculum over a three-month period. Time data were analyzed by activity, with a posttest nutrition achievement test as the dependent variable and the three time dimensions, grade, and ability levels as independent variables in a series of stepwise multiple regressions. Direct instruction consistently predicted posttest achievement.

AUTHOR Tursman, Cindy

TITLE Good Schools: What Makes Them Work. Education USA Special Report.

INSTITUTION National School Public Relations Association, Arlington, VA

PUB DATE 1981

NOTE 7 pages

ERIC NUMBER ED 210 797

ABSTRACT Summarizing recent research, this seven-chapter report gives both characteristics and examples of effective schools and lists recommendations for achieving school effectiveness. Chapter 1 cites numerous recent studies to show that, in contradiction to earlier conclusions by James S. Coleman and Christopher Jencke, schools can be effective. Chapters 2 and 3 discuss a number of features of effective schools, including strong instructional leadership from principals, teacher effectiveness in managing the classroom and keeping students on task,

a positive school climate, and curricula designed to meet students' specific educational needs. Examples of "maverick" schools in urban, suburban, and rural contexts, presented in chapters 4-6, illustrate how a wide variety of schools are effective, be they rich or poor, old or new, elementary or secondary, alternative or traditional, comprehensive or specialized, or vocational or academic. Chapter 7 reviews recommendations from educators, researchers, journalists, parents, and students for making schools effective. The recommendations involve school leadership and governance, staff skills, school expectations and monitoring of student performance, and community support.

AUTHOR Walberg, Herbert J.

TITLE A Theory of Educational Productivity

PUB DATE January 1978

NOTE 27 pages: paper presented at annual meeting of the Georgia Educational Research Association (January, 1978)

ERIC NUMBER ED 167 462

ABSTRACT To increase educational productivity and efficiency, educational process goals as well as achievement goals must be considered. Educational process goals are interpreted to include student perceptions of the social environment, creativity, self-concept, participation in extracurricular activities, and interest in subject matter. Ignoring these perceptions and experiences in favor of traditional goals measured by test scores will decrease motivation and ultimately lower educational achievement. Many educational experiments and psychological theories of education fail to produce desired educational outcomes because they do not clearly identify, define, and measure educational variables. For example, the Higher Horizons Program in New York attempted to upgrade the educational experience of children from deprived backgrounds by reducing class size to five or six students and adding numerous enrichment factors. Because program directors did not consider factors such as the interaction between family and instructional environments, performance scores on tests were not higher. Considerable research is needed to relate educational policy and practice to productivity of schools. Methodology should consider students' ability and motivation, the quality and quantity of instruction, class social environment, and home environment.

REFERENCES

Atkinson, R.C. "Computer-Based Instruction in Initial Reading." In Proceedings of the 1967 Invitational Conference on Testing Problems. Princeton, NJ: Educational Testing Service, 1968.

Block, J.H., ed. Mastery Learning: Theory and Practice. New York: Holt, Rinehart and Winston, 1971.

Bloom, B.S. "Time and Learning." In Learning and Instruction. edited by M. C. Willrock. Berkeley: McCutchan, 1977.

Borg, W.R. "Time and School Learning" In Time to Learn, edited by Carolyn Denham and Ann Lieberman. Washington, DC: National Institute of Education, 1980.

Brady, M.E.; Clinton, D.; Sweeney, J.M.; Perterson, M.; and Payner, H. Instructional Dimensions Study, Washington, D.C.: Kirschner Associates, 1977.

Caldwell, J.H.; Huitt, W.G.; and Graeber, A.O. "Time Spent in Learning: Implications from Research." Elementary School Journal, 82, no. 5 (1982): 471-480.

Campbell, P.B.; Gardner, J.; Seitz, P.; Chukwuma, F.; Cox, S.; and Orth, M. Employment Experiences of Students with Varying Participation in Secondary Vocational Education. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University 1981.

Carroll, J.B. "A Model of School Learning." Teachers College Record 64 (1963): 723-733.

Coleman, J.S. et al. Equality of Educational Opportunity. Washington, D.C.: U.S. Government Printing Office, 1966.

Cusick, P.A. Inside High School. New York: Holt, Rinehart and Winston, 1973.

Evans, R.N. "Reauthorization and the Redefinition of Vocational Education." VocEd 56, no. 1 (January-February 1981): 30-34.

Evans, R.N., and Herr, E.L. Foundations of Vocational Education. Columbus, OH: Charles E. Merrill, 1978.

Evertson, C. "Differences in Instructional Activities in High and Low Achieving Junior High Classes." Paper presented at the annual meeting of the American Education Research Association, Boston, April 1980.

Evertson, C.M., and Veldman, D.J. "Changes Over Time in Process Measures of Classroom Behavior." Journal of Educational Psychology 73 no. 2 (1981): 156-163.

Farley, J. Vocational Education Outcomes: A Thesaurus of Outcome Questions. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Fisher, C.W.; Filby, N.N.; Marliave, R.S.; Cahen, L.S.; Dishaw, M.M.; Moore, J.E.; and Berliner, D.C. Teaching Behaviors, Academic Learning Time and Student Achievement: Final Report of Phase III-B. Technical Report V-I. San Francisco: Far West Laboratories, 1978.

Flanders, N.A. "The Problems of Observer Training and Reliability." In Interaction Analysis: Theory, Research and Application. edited by E.J. Amidon and J.B. Hough. Reading, MA: Addison-Wesley Publishing Co., 1967. 158-166.

Frederick, W.C., and Walberg, H.J. "Learning as a Function of Time." Journal of Educational Research (March/April 1980): 183-193.

Glaser, R. "Adapting the Elementary School Curriculum to Individual Performance." In Proceedings of the 1967 Invitational Conference on Testing Problems. Princeton, NJ: Educational Testing Service, 1968.

Golladay, M.A., and Wulfsberg, R.M. The Condition of Vocational Education. Washington, DC: National Center for Education Statistics, U.S. Department of Education, 1981.

Goodlad, J.I.; Sirotnik, K.A.; and Overman, B.C. "An Overview of 'A Study of Schooling'." Phi Delta Kappan (November 1979): 174-178.

Holmes, H.W. "Time Distributions by Subjects and Grades in Representative Cities." In The Fourteenth Yearbook of the National Society for the Study of Education, Part 1, Minimum Essentials in Elementary-School Subjects-Standards and Current Practices. edited by S.C. Parker. Chicago: University of Chicago Press, 1915.

Karweit, N., and Slavin, R. Time-on-Task: Issues of Timing, Sampling & Definition. Baltimore: Center for Social Organization of Schools: The Johns Hopkins University, October 1980.

Kazanas, H.C. "Affective Work Competencies for Vocational Education, Information Analysis Series no. 138. Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education, The National Center for Research in Vocational Education, The Ohio State University, 1978.

Kerlinger, F.N. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, 1973.

Lomax, R.G., and Cooley, W.W. The Student Achievement Instructional Time Relationship. Presented at the American Education Research Association annual meeting, San Francisco, April 1979.

Mann, C.H. How Schools Use Their Time: Practice in 444 Cities Including a Study of Trends from 1826 to 1926. New York: Teachers College, Columbia University, 1928.

McKinney, F., Franchak, S.; Halasz, I.; Morrison, I; and McElwain, D. Factors Relating to the Job Placement of Former Secondary Vocational Education Students. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1981.

McKinney, F. and Fornash, P. Selected Evidence Supporting or Rejecting Outcomes for Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, to be released January 1983.

Medley, D., and Mitzel, H. "Measuring Classroom Behavior by Systematic Observation." In Handbook of Research in Teaching. edited by N. Gage. Skokie, IL: Rand McNally, 1963.

National Assessment of Educational Progress Newsletter, 15, no. 3 (Fall 1982). Produced by National Institute of Education.

Nie, N.H.; Hull, C.H.; Jenkins, J.G.; Steinbrenner, K.; and Bent, D.H. Statistical Package for the Social Sciences, 2nd ed. New York: McGraw-Hill, 1975.

Peterson, P. A Review of the Research on Mastery Learning Strategies. Unpublished manuscript. Stanford, CA: Stanford Center for Research and Development in Teaching, 1972.

Rosenshine, B.V. "How Time is Spent in Elementary Classrooms." Journal of Classroom Interaction 17, no. 1 (1981): 16-25.

Ruff, R. et al. An Examination of Non-occupationally Specific Outcomes of Secondary Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1981.

Rutter, M.; Maughan, B.; Mortimore, P.; Ouston, J.; and Smith, A. Fifteen Thousand Hours: Secondary Schools and Their Effects on Children. Cambridge, MA: Harvard University Press, 1979.

Ryans, D.G. Characteristics of Teachers. Washington, DC: American Council on Education, 1960.

Selz, N. The Teaching of Employability Skills: Who's Responsible? Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1980.

Sirotnik, K.A. "The Contextual Correlates of the Relative Expenditures of Classroom Time on Instruction and Behavior: An Exploratory Study of Secondary Schools and Classes." American Education Research Journal 19, no. 2 (1982): 275-292.

Soar, R.S. "The Social Realities of Teaching." Teachers College Record 80 (September 1978): 54-68.

Stallings, J. A. "Allocated Academic Learning Time Revisited, or Beyond Time on Task." Presented at the American Education Research Association annual meeting, Boston, 1980.

Stallings, J. A. "The Importance of Multiple Data Collection Instruments When Describing the Educational Process." Presented at the American Research Association annual meeting, New York, 1977.

Stallings, J.A. "Changing Teacher Behavior: A Challenge for the 1980's." Presented at the American Education Research Association annual meeting, Los Angeles, 1981.

Stallings, J.A. "Classroom Research: Implications for Mathematics and Science Instruction." Presented at the Biological Science Curriculum Study Conference, Boulder, CO. 1980.

Stallings, J.A., and Kaskowitz, D.H. "Follow-Through Classroom Observation Evaluation 72-73." Menlo Park, CA: Stanford Research Institute, 1974.

Stallings, J.A., and Kaskowitz, D.H. Follow Through Classroom Observation Evaluation, Executive Summary 1972-1973. Menlo Park, CA: Stanford Research Institute, 1974.

Stallings, J.A., and Mohlman, G. G. "School Policy, Leadership Style, Teacher Change, and Student Behavior in Eight Schools." Final report. Mountain View, CA: Stallings Teaching and Learning Institute, 1981.

Weber, J.M. Interim Report: A Comparative Study of Basic Skills in Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, January 1982.

Wiley, D.E., and Harnischfeger, A. "Explosion of a Myth: Quantity of Schooling & Exposure to Instruction, Major Educational Vehicles." Educational Researcher 3 (1974): 7-12.

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1962.

individual activities or lectured. At the beginning of shop classes the students set up their equipment and projects for several minutes. The students then worked intensely for awhile until there was a formal or an informal break or a change in the type of activity. The T & I and AG classes often started with a lecture and then changed to practice in the shop area of the classroom. After the break or change, the students again worked fairly intensely until the time to start cleaning up. There were variations, of course, within classes because of interruptions or nonroutine activities such as the FFA conference. Variations also existed among classes, especially between the MDE classes and the T & I classes.

The teachers appeared to be the key determinant in the amount of time students spent on task or off task. While students may have known what they were supposed to do on their own, a few invariably required individual teacher attention to set up, organize for working with the equipment, or open their books. Nevertheless, in some instances the students supervised their own time on task. In all of the shop classes the students spent most of their time on individually paced projects (described by teachers as competency based). Small groups of students often worked together to assemble a piece of machinery or solve a problem, as in the fashion merchandising class. Sometimes students served as a shop foreman or toolroom supervisor for a day and did not work on individual or small group projects. A few students in the MDE classes were assigned to the class laboratory store or boutique to serve as salespersons who waited on customers, stocked the shelves, and counted merchandise for inventory purposes.

Attendance is illustrated with line graphs, with the average for all classes across the ten days of observation shown in figure 5 and the averages for the individual classes in figures 27 through 36 (Appendix C). As indicated in figure 5, the average attendance was slightly higher during the second week than during the first week of observations. The data in table 2 show that absence was over 20 percent during the first week compared to about 17 percent the second week. The lowest average percentage of absence, computed from the totals shown in table 2, was at the rural site (12 percent) with the highest at the inner city (19.5 percent), the suburban (20.5 percent), and urban (21 percent) sites. The time spent in school is, of course, a significant determinant of the amount of time available for student to learn. It appears that, on the average, the students observed were absent from their vocational education classes approximately 18 percent of the time scheduled.

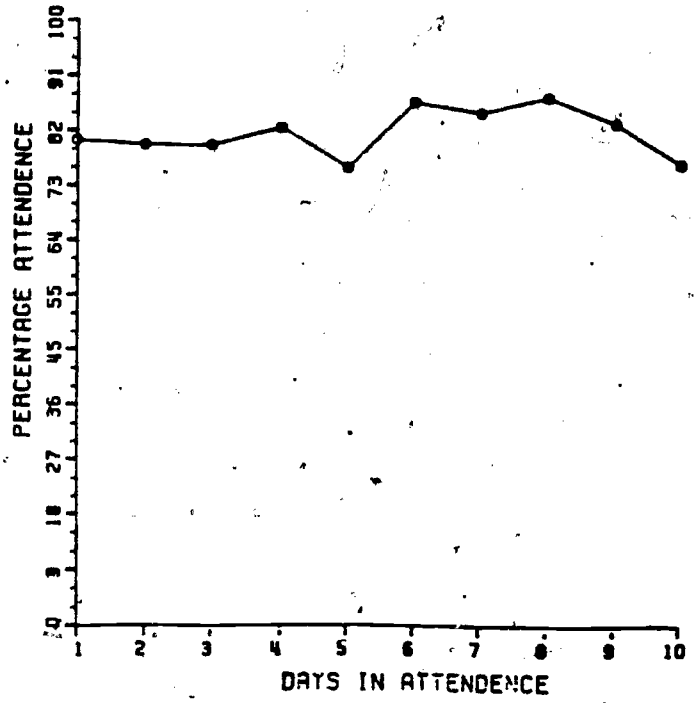

FIGURE 5. AVERAGE PERCENTAGE OF ATTENDANCE FOR ALL CLASSES DURING TWO WEEKS OF OBSERVATION

Across all the variables discussed in the first question 1 there is considerable variation among the vocational education classes observed in this study. It is tempting to conclude from the average of all the classes that vocational education students spend 69 percent of class time on task and 31 percent off task. It is prudent to remember, however, that these classes represent three program areas and were not selected at random. It is also important to emphasize that the tables and figures for the individual classes portray striking differences that must be acknowledged when making comparisons or judgments. For example, the average time on tsk in one MDE class (22233) was 51.0 percent in contrast to 86.4 percent in a T & I class (35353).

Question Two

What are the proportions of time that the three selected students in each class spent on task (content and noncontent), off task, and on absence?

The second question provided information about the time spent each minute by thirty students from the ten classes. The data in table 3 show that the thirty students' total time on task in ten classes through ten class periods ranged between 35 and 88 percent. There was a wider range of time on task/content among students in different classes than among students in the same class. The time on task/noncontent varied considerably from virtually no time (0.0, 0.0, 0.5 percent) spent on activities such as set up/clean up in a distributive education class (22233) to about a fourth of the time (28.2, 21.5, 26.5 percent) spent on those activities in a machine shop class (35353). There is, of course, little need to set up or clean up in most MDE classes, but the time spent on those activities in that machine shop (35353) appears excessive compared to the time spent in the other machine shops (5.6 - 11.1 percent).

The students' time off task ranged from 12.2 percent for one student in Machine Shop (35353) to 61.3 percent for a student in Distributive Education (22233). There seems to be an inverse relationship between the time spent on task/noncontent and time off task for the students in these two classes (35353 and 22233). Perhaps the small size number of students--only seven in the Machine Shop class (35353) was easier to keep on task, or perhaps the students had learned to appear busier than they really were by manipulating machinery and tools instead of merely waiting or socializing between time spent working.

Absences varied among the students, with a range of no minutes tardy (0.0 percent) to a combined time of absence and minutes tardy of 33.4 percent of their total possible time in class. The absence rate should be kept in mind, as cautioned previously, when considering how much time students really spent learning in their classes.

Question Three

What is the significant difference between the mean of the three students in each class and the mean of all the students in the class in the proportion of time on task (content and noncontent), off task, and on absence?

The third question provided comparisons of the three students to their own classes. One machine shop class (35353) was dropped from this analysis because its low enrollment of seven students would have skewed the results. For each variable, the mean of the three individual students' proportions of time was compared to the class mean with a t-test. The results, as displayed in tables 15 through 21 (Appendix B), showed no significant differences (0.05) for either on task (content and noncontent) or off task for any of the comparisons. The means for the

TABLE 3

PROPORTIONS OF TIME [1] SPENT BY
THREE INDIVIDUAL STUDENTS IN TEN VOCATIONAL EDUCATION CLASSES

Class	Student	Time on Task			Time Off Task	Absence(2)
		Total	Content	Non-Content		
Agriculture Mechanics (11115)	1	73.5	65.5	8.0	26.5	0
	2	67.3	66.5	.8	32.7	10.0
	3	68.4	67.1	1.3	31.6	0.1
Agriculture (22143)	1	76.1	75.2	.9	23.9	0
	2	73.1	72.2	.8	27.0	0
	3	69.4	68.3	1.1	30.5	20.2
Distributive Education (22233)	1	52.2	52.2	0.0	47.9	0
	2	48.7	48.7	0.0	51.3	0
	3	38.2	38.2	.5	61.3	0
Fashion Merchandising (34263)	1	86.0	79.5	6.5	14.0	0
	2	82.3	79.8	2.5	17.4	20.3
	3	78.7	75.8	2.9	21.3	2.4
Market & Distributive Education II (46273)	1	34.5	33.4	.3	56.3	10.1
	2	51.9	51.8	.3	47.8	.3
	3	48.7	48.6	.2	51.1	20.1
Market & Distrib. Ed. IV (46282)	1	61.4	61.0	1.7	37.3	12.4
	2	52.9	52.9	.0	47.1	3.0
	3	59.3	59.1	.4	40.5	20.0
Machine Trades (11323)	1	73.5	65.5	8.0	26.5	10.1
	2	77.4	66.4	11.1	22.5	0.1
	3	74.7	68.1	7.6	24.3	10.7
Machine Shop (23324)	1	62.3	56.2	6.1	37.7	30.0
	2	75.9	67.9	8.0	24.1	.1
	3	73.3	67.9	5.6	26.5	10.1
Machine Shop (35353)	1	87.7	59.6	28.2	12.2	11.1
	2	77.8	56.3	21.5	22.2	33.4
	3	86.3	59.9	26.5	13.6	0
Auto Body (47393)	1	71.1	70.2	.9	28.9	.1
	2	71.7	71.1	.7	28.2	.2
	3	49.9	49.1	.1	50.0	20.1

NOTE: 1 Mean percents for both weeks observed
2 Absence includes minutes late for class

individual students were higher for technical skills and time off task, while they were lower for set up/clean up than the means for their classes.

There were significant differences well beyond the 0.01 level, between the means of the individual students and their class means with respect to absence. The means of the individual students were considerably lower (0.48) than the means for their classes (19.26).

The results indicate that the means of the three students were representative of their classes in the proportions of time spent in their classes upon various on-task and off-task activities. They were obviously not representative in absence. Perhaps the observers inadvertently selected students who were more motivated to attend class than their classmates. From this analysis it could be inferred chat a relatively small number of students (3) can be used to determine the time on or off task of a class, but not necessarily their average rate of absence.

Question Four

What are the proportions of time spent by the teachers on content and on noncontent?

The results of the fourth question indicated the amount of time teachers spent on curricular content in their classes. As shown in table 4, teachers allocated, on the average, 67.0 percent of their class time for time on content. They spent the remaining 32.7 percent of the time on noncontent activities, including tasks such as taking roll.

There was a range of 42 to 76 percent time on content among all the teachers. The T & I teachers spent the highest proportion of time on content (72 percent) while the MDE teachers spent the lowest (57 percent). The teachers used the bulk of the time for technical skills, with the T & I teachers using an average of 57 percent of the time for practice of technical skills and another 10 percent for related theory. While the two AG teachers spent similar amounts of time (50 and 48 percents) on technical skills, the teacher of Agricultural Mechanics (11115) spent 42 percent on practice compared to 10 percent by the teacher in Vocational Agriculture (22143). The MDE teachers used the least amount of time for technical skills, with 19 percent for related theory and 18 percent for practice. On the other hand, the MDE teachers spend far more time (18 percent) than the other teachers (1 percent) for employability skills. On the whole, the teachers spend very little time (4 percent) on basic skills, with the exception of the teacher in Vocational Agriculture (22143) who had a much higher percentage (16 percent).

TABLE 4

PERCENT OF TIME SPENT ON TYPES OF CONTENT
BY TEACHERS IN VOCATIONAL EDUCATION CLASSES

PROGRAM AREA Class (study code)	Basic Skills w/Tech Skills	Tech Skills/ Theory	Tech Skills/ Practice	Job Seeking, Maintaining Advancing	Knowledge World of Work	Work Attitudes & Values	Total on Content	Other/ Management/ Transition	Note:
Agricultural Ed.									
Agr. Mechanics (11115)	6.3	18.4	42.4	.1	.8	.6	69.3	30.7	Substitute 2 days
Vocational Agr. (22143)	16.4	38.6	9.5	0	0	0	64.5	35.5	Substitute 1 day
Mean	11.35	28.5	29.95	.5	.4	.3	66.9	33.1	
Distributive Ed.									
Dist. Ed. (22233)	0	29.5	29.5	11.8	0	0	71.4	28.6	
Fash. Merch. (34263)	1.7	28.1	31.4	1.0	2.6	4.0	71.3	28.7	
Mktg. & Dist. II (46273)	0	11.1	8.1	16.5	6.4	0	42.1	57.9	Substitute 2 days
Mktg. & Dist. IV (46282)	.7	9.1	2.2	21.3	10.2	0	43.7	56.3	Substitute 1 day
Mean	.6	19.45	17.8	12.65	4.8	1.0	57.12	42.88	
Trade & Industrial									
Autobody (47391)	2.5	4.4	68.8	0	.3	0	76.3	23.7	
Mach. Trades (11323)	2.2	5.3	54.2	.1	.4	.2	62.6	37.4	Substitute 2 days
Mach. Shop (23324)	5.7	27.4	39.2	0	0	0	72.3	27.7	
Mach. Shop (35353)	7.7	3.1	64.5	0	0	0	76.2	23.8	
Mean	4.53	10.05	56.68	.25	.18	.05	71.85	28.15	
Mean for all teachers	4.1	15.9	41.4	3.2	1.5	.5	67.0	32.7	99.7[1]

NOTE: Percents for teachers include ten classes observed in the study; ninety-nine classes observed in total.
[1]Total does not equal 100 percent due to rounding.

The data from table 4 show that the teachers' average time on curricular content was 67 percent, while, as shown in figure 4 previously, the students' average time on content was 56 percent. This disparity between teacher and student time on content is consistent with other findings (Stallings and Kaskowitz 1974; Fisher et al. 1978) indicating that students typically are not on task all of the time that is allocated for subject matter. Regardless of how much teachers attempt to keep every student motivated and at task with specified content, some students socialize, or do other things. The findings from this study suggest either that some teachers may have used better strategies to keep students on task than other teachers or that the particular curricular content of a class is more conducive to time on task.

Question Five

What are the proportions of time spent by teachers on various pedagogical methods and other activities?

The fifth question yielded information about the various ways teachers manage and teach their classes. As shown in table 5, teachers spent well over a fourth (29 percent) of their time providing one-to-one instruction. Table 5 displays the teachers' primary pedagogical methods or activities while table 14 (Appendix B) shows the second method/activity they employed simultaneously. For example, the second method/activity was recorded to portray accurately those instances when the teacher lectured and showed slides at the same time. As the data in table 14 (Appendix B) indicate, during 61 percent of the time the teachers used no secondary method/activity.

The teachers worked at their desks or stations in the class or shop almost 12 percent of the time. They observed students working at their stations, either by standing or walking around, almost 9 percent of the time as a primary method/activity and 7 percent as a secondary activity. The teachers gave directions or provided instructions similar amounts of time (almost 9 percent primary, 7 percent secondary). Although lecture and discussion were the chief instructional methods in secondary academic subject classes (Stallings and Mohlman 1981), in this study teachers lectured 8 percent and led discussions about 3 percent of the time, while they provided one-to-one instruction 29 percent of the class time.

A relatively high percentage of time was recorded for talking to the observers from this study, although the data were heavily skewed because of one teacher's (15 percent) persistence in talking to one or another of the observers. The other nine teachers spent between 0 to 5 percent of their class time talking to the observers.

Table 5

PERCENT OF TIME SPENT ON PRIMARY INSTRUCTIONAL METHODS/ACTIVITIES BY TEACHERS IN VOCATIONAL EDUCATION CLASSES

PROGRAM AREA CLASS (Study Code)	Individual Instruction	Work at Desk	Observe Students	Give Directions or Instruction	Lecture	Talk to Observer	Out of Classroom	Talk to other staff/ nonclass students	Lead discussions
Agricultural Ed									
Agr. Mechanics (11115)	24.3	2.5	12.7	7.6	5.8	0.7	3.0	.9	4.9
Vocational Agr. (22143)	.5	5.5	11.3	15.7	33.4	3.2	.2	3.2	3.0
Mean	24.4	4.0	12.0	11.65	19.6	1.95	1.6	2.05	3.95
Distributive Ed.									
Dist. Ed. (22233)	14.3	8.6	4.3	18.9	23.8	1.4	0	2.2	.9
Fash. Merch. (34263)	19.3	4.3	11.3	8.7	6.0	0	.9	2.1	14.3
Mktg. & Dist. II (46273)	1.4	36.2	5.3	3.0	23.8	1.4	7.7	.6	0
Mktg. & Dist. IV (46282)	0	42.8	1.3	0	26.1	1.3	9.3	2.4	0
Mean	8.75	22.98	5.55	7.65	19.93	1.03	4.48	1.83	3.8
Trade & Industrial									
Autobody (47391)	46.5	.7	4.2	8.6	3.9	14.8	2.7	3.5	.2
Mach. Trades (11323)	37.2	14.0	19.1	6.5	.3	1.4	2.0	2.9	1.8
Mach. Shop (23324)	29.5	20.6	5.7	15.7	0	4.2	5.3	6.1	.2
Mach. Shop (35353)	63.5	1.3	9.9	2.8	1.2	.5	1.4	2.4	.2
Mean	44.18	9.15	9.73	8.4	1.35	5.23	2.85	3.73	.6
Mean for all teachers	29.1	11.8	8.8	8.8	8.3	3.7	3.2	2.8	2.6

NOTE: Primary instructional methods/activities were observed to be the chief mode used by teachers; during 39 percent of the time a secondary mode was occurring concurrently. Percentage for teachers include ten classs observed in the study; ninety-nine classes observed in total. Additional methods/activities upon which teachers spent low proportions of time in classes:

none indicated	1.0	write on board	.5
pass out materials	.6	check out tools	.5
grade papers	.6	discipline	.3
repair equipment	.6	pass out-collect papers	.2
miscellaneous	.6	get materials	.1

Surprisingly, the teachers did not spend much time (2 percent primary, 6 percent secondary) in demonstrating techniques, especially to the entire class. During informal discussions after the classes, the teachers explained that most of their lectures and demonstrations about new skills had been done during the earlier months of the school year. All the T & I teachers helped clean up the shops (1 percent of the time), while none of the teachers in the other program areas did so.

Many time-on-task studies point to discipline as one of the teacher's chief activities (Stallings and Mohlman, 1981). In this study, teachers spent very few minutes (.3 percent) disciplining the students. Teachers reprimanded students or asked them to stop talking occasionally, but even with substitute teachers the majority of the students did not receive much attention for disciplinary reasons. The observers noted that there were a few occasions when the teachers overlooked or deliberately ignored behaviors such as playing cards or throwing paper wads. For most of the time observed, however, the students were occupied in relatively active tasks that appeared to hold their interest or they were socializing in a very low-key fashion that did not detract from other students' learning. In contrast, the teachers of most academic subject classes usually do not tolerate even low-key student interaction. Therefore, disciplinary action or reprimands from these teachers are common occurances in their classroom. This could account for the disparity between time spent on discipline in academic and vocational education classes.

Question Six

What are the significant differences among short, medium, and long classes in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

Previously table 2 shows the length of each class in minutes. The short classes (46 to 56 minutes) were Vocational Agriculture (22143), Distributive Education (22233), and Marketing and Distribution IV (46282). All of the short classes were located at comprehensive high schools. The medium classes (111-126 minutes) were Agricultural Mechanics (11115), Fashion Merchandising (34263), and Marketing and Distribution II (46273). The first two of these medium length classes were at area vocational schools while the latter was at a comprehensive high school. The long classes (146-176 minutes), located at area vocational schools and all T & I courses were Autobody (47391), Machine Trades (11323), Machine Shop (23324) and Machine Shop (35353).

The results of F-tests, shown in tables 22 through 28 (Appendix B), indicated significant differences among the

different length classes at well beyond the 0.01 level in time on technical skills and time on set up/clean up. The results also indicated significant differences (0.05 level) in total time on task and time on employability skills. But they did not indicate significant differences for time on basic skills or absence among classes of different lengths.

Further analyses were conducted to discern which classes--short, medium, or long--were most different from each other in the variables that showed a significant difference. The results of the Student-Newman-Keuls procedure are displayed in tables 29 through 33 (Appendix B). These tables graphically indicate that the greatest differences were to be found between short and long classes, with medium classes either more similar to one or the other depending on which variable was considered. The long classes had the highest means, or greatest proportion of time for all of the on task variables (time on task, technical skills, employability skills and set up/clean up).

Therefore, it can readily be concluded of analyses that students in long classes (146-176 minutes) had significantly higher proportions of time on task, especially in technical skills and set up/clean up than students in short classes (46-56 minutes). In this study, all the T & I classes at area vocational schools were long ones. The means of medium length classes (111-126 minutes) were closer to those of short classes for technical skills and closer to those of long classes for total time on task. Apparently, class length made a significant difference in the amount of time spent on task in vocational education classes, with more class time resulting in higher proportions of time on content-related activities.

Question Seven

What are the significant differences among the program areas (AG, MDE and T & I) in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, and on absence?

The program areas (AG, MDE or T & I) of each class are listed in table 2. The proportions of time spent in the two AG, four MDE and four T & I classes were analyzed with F-tests (tables 34 through 40, Appendix B), which indicated significant differences (0.05 level) for time on task and for time on set up/clean up. There were also significant differences (.05 level) for time on absence with no significant differences for the other variables tested.

The Student-Newman-Keuls procedure was used to discern homogeneous subsets for the variables that indicated significant differences among the program areas. As the data in tables 41 through 43 (Appendix B) indicate, the MDE classes had the lowest proportion of time on task while the T & I and AG classes had the highest. The MDE and T & I classes differed most from each other in the amount of time spent for set up/clean up while the AG classes were statistically between both of the other types of classes. The AG classes showed a low mean for absence (10 percent), while the T & I and MDE classes showed significantly different higher means (19 and 21 percents).

While the program areas are not represented with equal numbers of classes or students in this study, it appears that there is a trend for higher proportions of time on task in the classes that have more opportunities for hands-on practice of skills and where other than content specific activities such as set up or clean up add to the total amount of time on task. There seemed to be no readily discernable reason, however, for the discrepancy in absence between the AG and the T & I/MDE programs from the evidence analyzed in this study.

Question Eight

What are the significant differences among the three machine shops in the proportion of total time on task, on basic skills, on technical skills, on employability skills, on set up/clean up, off task, and on absence?

For the answer to the question, three classes in the same program area and with similar curricula were compared. As presented in tables 44 through 50 (Appendix B), F-tests were again used to analyze the variance among the three machine shops for significant differences (0.05 level) among several variables. No significant differences were found for absence, time on basic skills, or time on employability skills. But a significant difference (well beyond the 0.01 level) did emerge for set up/clean up, as well as significant differences for total time on task and time on technical skills.

The Student-Newman-Keuls Procedure analyses indicated (tables 51 through 54, Appendix B) that the greatest difference for time on task was between the urban machine shop (23324) and the inner-city machine shop (35353), with the latter having the higher mean. Similarly, those two machine shops had the largest discrepancy (7 percent urban, 24 percent inner city) for set up/clean up. The greates discrepancy for time off task was found

between the inner-city (35353) and the rural machine shop (11323). The latter had the greatest proportion of time off task among the three classes. Although this statistical procedure did not find significant (0.05 level) discrimination among the three classes in terms of homogeneous subsets for technical skills, the means of the rural machine shop (11323) and urban machine shop (23324) appeared much lower (44 and 47 percent) than the mean for the inner city machine shop (62 percent).

One conclusion that can be drawn from the foregoing analysis is that, despite the similarities in program (T & I), class name (machine shop), curriculum, of stated purpose, these factors appear to include the number of students in the class and the length of the class, most importantly perhaps, as classes probably differ (statistically) significantly in time on various activities because of many factors beyond similarity in program, class name, curriculum, or stated purpose. As shown in the results of a previous question, the time allocated by the teacher determines the upper limit of time possible for students' time on task/content.

Question Nine

What are the significant differences between classes taught by substitute teachers and those taught by the regular teacher in terms of time on task?

Nine of the ninety-nine class periods observed in this study were taught by substitute teachers. The proportions of time on task for the five classes that had a substitute teacher during the ten days of observation were analyzed with a t-test to compare for significant differences in the means between days with and without a substitute teacher. According to the data in table 55 (Appendix B) a significant difference at the 0.046 level, emerged, indicating that classes with the regular teacher had a higher proportion of time on task than those taught by the substitutes.

Observers noted that, although the substitute teachers were task oriented and tried to motivate the students to work on their projects in the shop classes, the students appeared to socialize more and avoided long periods of involvement with their work. None of the substitutes appeared to "baby sit," and most seemed to be familiar with the class routines because they had substituted in the school and in the class previously. In the agricul tural mechanics class (11115), the substitute was a former school farm manager who served as a permanent substitute in the system since the school farm had been sold. In one MDE class, the substitute was a former teacher, now a restaurant owner who appeared to capture the students' interest with his explanations of how marketing and sales are conducted in the "real world" of business.

Nonetheless, despite the efforts of the substitutes, it must be concluded that students were on task more often when their regular teachers were present. Perhaps one of the primary motivating factors for students' on task learning behaviors is whether they are being evaluated for their efforts. If being graded is a factor, then the substitute teacher surely would not have the same influence as the regular teacher. On the other hand, a case could also be made that the regular teacher manages the students better through different instructional methods than those used by the substitute teachers. The question of the instructional methods' effect on time on task remains to be answered in further study in vocational education classes.

Question Ten

What are the significant differences between classes with fewer or more students in the proportion of time on task?

This question sought to ascertain whether class size appears to affect time on task in vocational education classes. It is important to obtain this information since a previous question confirmed that vocational education teachers provide a great deal of one-to-one instruction. Obviously, the larger the class, the less time is available for instructing individual students.

Since there was only one small class with seven students (machine shop 35353), it was dropped from this analysis. A t-test was conducted between the remaining five medium classes (15 - 17 students) and the four large classes (24 - 26 students). Table 56 (Appendix B), indicates that medium classes, with a 74 percent mean, had a significantly higher (well beyond the 0.01 level) proportion of time on task than did large classes, with a 59 percent mean. Thus, the conventional belief that small class size is related to more opportunity for school learning holds true in this study. Incidentally, the smallest class, which was not included in the analysis, had a mean of 86 percent time on task.

It is also important to keep in mind, however, the previous analyses revealing that T & I and AG classes and long classes had the most time on task. A review of table 2 shows that T & I classes were all long, while varying in size from small to medium to large, and that AG classes were both short and medium in length and medium in size. This combination of variables, and others discussed earlier, indicates that no simple and clear set of factors correlates precisely with time on task. Several variables or combinations of variables appear to have implications for time on task, and they must be explored in further studies.

CHAPTER FOUR

SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

Summary of the Findings

The 11,400 minutes recorded in ten different vocational education classes yield a wealth of data about how time was spent by 186 students and ten teachers. Taken alone, the data records a small slice of school life in four communities observed during two weeks in March and April of 1982. As interpreted, the data show the proportions of time spent by teachers on vocational education content and the proportion of time used by students for learning this content (table 6).

TABLE 6

SUMMARY OF FINDINGS OF
STUDENTS' AND TEACHERS' TIME ON TASK

Students' Proportions of Time Spent			
Basic skills	6.74%		
Technical skills	41.17%	55.9% time	
Employability skills	7.99%	on task/content	
Set up/clean up	7.18%	13.2% time	
Related (tutoring, etc.)	6.07%	on task/noncontent	69.1% total time on task
Off task (socializing, etc.)	25.27%	30.9% time	
Break	5.67%	off task	
Absence			
Absence (including minutes tardy)	18.40%		
Teachers' Proportions of Time Spent			
Basic skills	4.10%		
Technical skills	57.30%	67.0% time	
Employability skills	5.20%	on content	
Other, management, etc.	32.70%	32.7% time on content	

Statistical analyses indicate that several factors--class type, class size, class length and classes taught by substitutes--appear to influence the proportion of time students spend on task (figure 6). There was no attempt made, however, to assess the quality of the time used in the classes, nor was there any provision for relating the proportions of time to desired outcome goals or achievement.

Factor	Finding
Day of the week	Somewhat higher proportion of time on task at beginning and end of week (not statistically significant)
Week of observation	Proportion of time on technical skills higher 1st week
Unit of Measure (1 minute) used in study	No difference in time on task when every 3rd or 5th minute compared with every minute
Teacher's time on content	Teachers had 67 percent time on content; student time on content 56 percent (not compared statistically)
Teachers' instructional methods and activities	The single largest percent (29%) of teachers' time spent on one-to-one instruction; 8 percent on lecture; 8 percent on leading discussions
Length of class: long = 146-176 minutes; medium = 111-126 minutes; short = 46-56 minutes;	Long classes had the most time on task (0.05) especially technical skills and set up/clean up; medium classes had the next highest; short classes had the least time on task
Program area	T & I and AG classes had the highest while MDE had the lowest time on task
Substitute teacher	A greater proportion of time on task was found with the regular teacher
Size of class: small = 7 students; medium = 15-17 students; large = 24-26 students	Medium classes had significantly higher proportion of time on task than large classes. The small class which was dropped from analysis had a higher proportion of time on task than the medium classes.

FIGURE 6

OVERVIEW OF FACTORS RELATED TO TIME ON TASK IN VOCATIONAL EDUCATION CLASSES

It is important to bear in mind that this was an exploratory study which limits generalizability of the findings. Nevertheless, the findings provide a beginning data base about time on task in vocational education classes. In addition, methodologies were developed for future time-related research in vocational education classes. Several analyses of variance were conducted to ascertain the differences if other methods or procedures had been used to collect data in the study.

The average proportions of time on task revealed by this investigation corroborate studies conducted in academic subject classes. Of course, the methodologies, terminologies, and proportions of time on task vary widely. There were wide variations of time on task found even among the ten classes in the study, especially on content, which indicate that there are numerous factors contributing to time spent on relevant curricular activities in vocational education classes.

Implications of the Study

The study's exploratory research findings provide a foundation of data rich with implications for educators, policymakers, and other constituents of vocational education. The first implication is that students' time on content appears to be proportionate with the time allocated by teachers. The students' time on content is consistently less than the teachers'. On average, the teachers allocated 67 percent of total class time for content--basic skills, technical skills, and employability skills--while the students spent 56 percent of their time on content. The fact that these proportions are commensurate with proportions in academic classes suggests that students, regardless of curricula fail to take full advantage of the opportunity to learn or to practice skills. A further implication regarding the teachers' influence of students' time on content is evident from the difference when there were substitutes in the classes. Students had consistently less time on content when substitute teachers were in charge.

A second implication is that while teachers may control the time available for content in their classes, other factors also appeared to contribute to the proportion of time students spent on task in the classes observed. Longer classes promoted more time on task than did shorter clases, and classes with lower enrollments had a greater proportion of time on task than did classes with higher enrollments. These findings suggest that the duration and the enrollment of classes are factors to consider when attempting to increase time on task. These findings can also shed some light on the currently debated issue of whether area vocational schools or comprehensive high schools are better suited to offer secondary vocational education. If time on task is a criterion for resolving the issue, then it appears that

area vocational schools in the study may have an edge because they housed all the longer classes.

A third implication is that some program areas fostered time on task more readily than did other program areas. In this study agricultural education (AG), marketing and distributive education (MDE), and trade and industrial education (T&I) represented three distinctive types of vocational education classes. MDE is generally taught in academic-style classes, frequently with a laboratory component where students manage a school store or do other types of hands-on work. These classes offer less opportunity for lengthy and intensive periods of individual practice than do classes of the other two types. Although subject matter can vary extensively in particular AG classes--from urban-based horticultural design to rural-based agricultural mechanics--AG classes can provide many hands-on task experiences during class hours. And T&I classes generally allocate even more of their time for hands-on work in the shop. Task-oriented and seemingly eager to assign individual projects in the shop area, teachers in T&I classes generally limited their lecture time. Thus, because opportunity for long periods of individual hands-on work was found to be conducive to more time on task, classes in the T&I and AG program areas had a significantly higher proportion of time on task than did those in MDE. Of course, this implication must be considered in the light of other factors, such as the teachers' instructional and managerial styles, duration of the class, and enrollment in the class.

A final implication is that the teachers' instructional and managerial methods may be critical to the proportions of time that students spend on content in vocational education classes. This study of vocational education classes shows that over a fourth (29 percent) of the teachers' time was spent walking around the room providing instruction and assistance to individual students or small groups. This pattern differs from the pattern in academic classes, where the teaching modes that correlated highly with time on task were lecture, discussion, and demonstration. Since it was not an objective of this study, however, there were insufficient data collected for useful correlations between teaching modes and students' time on task.

This study provides a foundation of information about the specific ways students and teachers spent time in ten vocational education classes. Statistical analyses imply that there are relationships among a number of factors that appear to influence the proportion of time students spend on task. There are numerous questions that remain to be answered and implications that need to be pursued with additional studies to provide a comprehensive understanding of how time on task can be maximized in different types of vocational education classes.

Recommendations for Further Research

This study was designed to be exploratory, a fact to keep in mind when evaluating the findings. More research is needed to determine the combination of factors--such as size of class, length of class, type of school, and pedagogical methods--that promotes the best proportions of time on and off task in vocational education classes.

No attempt was made to relate achievement of specified outcomes, such as attainment of certain levels of occupational competencies, to the proportion of time spent on technical skills. It is strongly recommended that the time spent on various skills or other activities be correlated with the desired outcomes. Prior to that, of course, it would be helpful to agree upon the desired outcomes or goals for secondary vocational education. The current lack of consensus inhibits any attempts to recommend changes in the curriculum or the instructional techniques. Without a national consensus on desired outcomes or goals, time-on-task research lacks the basis for making recommendations that will increase the effectiveness of secondary vocational education.

Another recommendation for further research is the examination of teachers' managerial activities and instructional methods as they may relate to time on relevant tasks in vocational education classes. There is undoubtedly a relationship, explored only superficially at this time, between the teachers' complex behaviors and the students' varied uses of time. Research into teacher behaviors that increase time on relevant tasks in lecture-oriented, academic classes must be supplemented by further research on those classes, based upon activities for individuals and small groups, that characterize programs in vocational education.

Further research is also needed to determine how well competency based instruction serves the individual students, and whether the numerous programs called "competency based" are indeed that. Observers in this study noted that several teachers felt they had a competency based program of instruction when, in fact, it was merely individually paced and lacked any specific measures of competency. In these classes, students completed projects at their own pace but did not appear to be using any competency guidelines.

It must be reiterated that further research is necessary to determine which type of school--the comprehensive high school or the area vocational school--is more effective in providing vocational education to secondary students. This issue is difficult to resolve because of the diversity in students' motivation for taking classes in secondary vocational education and because of the diversity of the outcomes expected from vocational education.

Finally, it is important to remember that time on task is one of several critical variables in the complex question of educational effectiveness. It is impossible to predict whether time on task will retain its current importance as research accumulates. Long-range research should be initated to develop a data base about time on task in vocational education classes in order to determine whether, over the long run, time spent on task improves the effectiveness and the occupational success of former vocational education students.

APPENDIX A: OBSERVATION GUIDES

/ Class Observation .

Page_____ of _____

Teacher Codes/Content

01 Basic skills with tech skills
02 Basic skills separate
03 Tech skills--theory
04 Tech skills--practice
05 Job SMA
06 Know W/W
07 Work Attitude
08 Other/management, transition

Method

09 Lecturing
10 Asking/answering questions
10 Leading discussion
11 Demonstrating
12 Using audio-visuals
13 Giving directions/instructions (class)
14 Providing individualized instruction
15 Testing/quizzing
16 Making assignments (class/homework)
17 Writing on board
18 Checking out tools/equipment
19 Securing materials out of class
20 Passing out materials
21 Observing students (walking/sitting)
22 Grading papers/projects
23 Working at desk/station in classroom
24 Working in adjoining office
25 Being out of classroom
26 Waiting; walking between rooms
27 Passing out/collecting papers
28 Talking with other staff (telephone)
29 Disciplining student(s)
30 Repairing equipment/tools
31 Other_____

	Time	Date Mo	Date Day	Observer	Site	School	Service Area	Class	Grade	Basic skills W/ tech skills R	Basic skills W/ tech skills C	Basic skills W/ tech skills W	Basic skills separate R	Basic skills separate C	Basic skills separate W	Tech Skills T	Tech Skills P	Job SMA	Know W/W	Work Att.	Waiting/ working	Socializing	Listening (announcements, etc.)	Setting up	Cleaning up	Being disciplined	Out of room (related/academic)	Out of room (nonrelated)	Conf. W/teacher	Talking break/lunch	T Codes Content	T Codes Method	Notes: (Unusual circumstances, total students, etc.)
1	:																															
2	:																															
3	:																															
4	:																															
5	:																															
6	:																															
7	:																															
8	:																															
9	:																															
10	:																															
11	:																															
12	:																															
13	:																															
14	:																															
15	:																															

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

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Student Observation

Page_____ of_____

Student Codes

01	Setting up for work	08	Answering/asking questions	15	Helping another student	22	Socializing
02	Practicing skills	09	Discussing (participating)	16	Being helped by another student	23	Other_____
03	Listening/observing	10	Taking notes (lecture/audio visual)	17	Supervising others' practice	24	Other_____
04	Reading	11	Using audio-visuals	18	Cleaning up		
05	Computing	12	Working (related) at another location	19	Being disciplined		
06	Writing	13	Being in another class (math, etc.)	20	Waiting/doing nothing		
07	Combining basic skills	14	Setting up a display	21	Talking with teacher		

Time	Date Mo	Date Day	Observer	Site	School	Service Area	Class	Grade	Basic Skills Separate (✓) 1 R	1 C	1 W	2 R	2 C	2 W	3 R	3 C	3 W	Technical Skills Theory 1	Theory 2	Theory 3	Practice 1	Practice 2	Practice 3	Job S,M,A 1	Job S,M,A 2	Job S,M,A 3	Knowledge W of W 1	Knowledge W of W 2	Knowledge W of W 3	Work Attitudes 1	Work Attitudes 2	Work Attitudes 3	Nonexistent 1	Nonexistent 2	Nonexistent 3	NOTES: (unusual circumstances)
1 :																																				
2 :																																				
3 :																																				
4 :																																				
5 :																																				
6 :																																				
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

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APPENDIX B: SUPPLEMENTARY TABLES

TABLE 7

ONE-WAY ANALYSIS OF VARIANCE FOR DAY OF THE WEEK AND TIME ON TASK

Source	Degree of Freedom	Sum of Squares	Mean Squares	F	(Probability)
Between groups	2	2085.011	521.253	1.514	(0.2040)
Within groups	96	32336.129	344.001		
Total	98	34421.140			

TABLE 8

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR TIME ON TASK

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	70.1953	21.228	1.74	0.62	97	0.538
2	50	67.8574	16.072	(0.055)			

TABLE 9

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR TECHNICAL SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	46.0690	26.002	1.79	2.13	97	0.036
2	50	36.2698	19.451	(0.045)			

TABLE 10

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR BASIC SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	4.8586	9.311	2.16	-1.56	97	0.122
2	50	8.5320	13.672	(0.009)			

TABLE 11

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR EMPLOYABILITY SKILLS

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	10.1143	24.053	2.58	1.01	97	0.314
2	50	6.0490	14.983	(0.001)			

TABLE 12

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR SET UP/CLEAN UP

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	6.2722	7.656	1.82	-1.81	97	0.421
2	50	7.7514	10.331	(0.040)			

TABLE 13

ONE-WAY ANALYSIS OF VARIANCE BETWEEN WEEKS FOR ABSENCE

Week	Number of Classes	Mean	Standard Deviation	F (Probability)	T	Degree of Freedom	2 Tail Probability
1	49	20.7227	14.813	2.77	1.61	97	0.111
2	50	16.7842	8.897	(0.001)			